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An International Magazine Published Monthly

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Volume XLVII
July to December, 1978

PUBLISHED BY
THE SURGICAL PUBLISHING COMPANY OF CHICAGO
54 EAST ERIE STREET CHICAGO
1928

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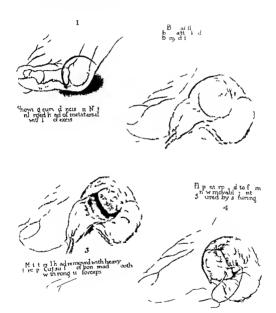
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SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED MONTHEY

VOLUME XI VII

JUIN 1928

NUMBER 1

SIMPTOMS PRODUCED BY DISTENSION OF THE CALEBIADDER AND BILLING DUCTS (

A CLINICAL AND EXTERIMENTAL STUDY

BY I SCHRACIR MD AND A CILL PRD MD CHICAGO A SISTER BY M KRONINBIRG MD AND P DISART BS

OR many years one of us (Schrager) has observed that certain cases of biliary colic are associated with re piratory embarrassment at the height of an util tek. It is our purpose to point out the clinical significance of this phenomenon and to present a detailed experimental study of the symptoms produced by distention of the gall bladder and biliary passages.

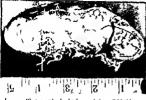
In 1908 Schriger was summoned to the bedside of a young woman 18 years of age who 3 days previously had had a normal delivery She was suddenly seized with a severe upper abdominal prin associated with an unusual respiratory embarrassment which lasted about 45 minutes subsided abruptly and recurred in the same minner twice in the fol lowing 5 days Several weeks thereafter a similar attack occurred. The pain was more definitely localized in the right hypochon drum radiated to the back and in other respects assumed a frank picture of gall stone colic Since the original observation Schriger has seen a number of cases of upper abdom inal distress associated with respiratory diffi culty following delivery especially in young primiparæ Several of these cases came to the operating table and it was observed that the degree of respiratory difficulty depended upon the degree of distention of the gall bladder wall

or the mechanical obstruction of the cystic duct Several cases of hydrops of the gall bladder markedly exhibited this respiratory phenomenon. This was found to be especially true when the cystic duct was blocked by a large stone.

A very striking case was that of a noman 40 years of age who was suddenly taken ill with a very severe pain over the base of the right lung which was associated with respiratory embarrassment. A physician related to the patient saw her severil times within 48 hours and made a diagnosis of acute Strapping of the chest salicylates and opiates gave the patient no relief Questioning of the patient disclosed the information that for the past 25 years she had had similar attacks associated with pain in the right hypochondrium Physical examination revealed a very marked tenderness below the right costal arch a sociated with marked resist ance to pressure Because of previous experiences Schrager was not confused by the respiratory phenomenon and location of the pain over the base of the right lung and diagnosed the condition as due to a distended gall bladder. Operation revealed an extreme hydrops of the gall bladder the organ was distended to the breaking point and contained a clear mucoid fluid. The eystic duct was impacted with a date like stone which was forced out with difficulty even after the removal of the gall bladder

As time went on Schrager learned to ascribe definite significance to the respiratory embarrassment associated with upper abdominal colic and quite uniformly found it to mean

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gall bladder distention with or without im paction of the cystic duct. In a limited number of cases the pain instead of radiating toward the back and shoulder is referred to the mid sternum. In people aged about 50 or more this clinical complex may suggest an ina The anginal picture as ociated with gall bladder pathology is at times confu ing and able chaicians have to weigh the exiden e very carefully before arriving at a final diag This differentiation becomes more nosis difficult when there are actual organic heart changes as ociated with chronic hall bladder pathology The reaction of the cardiova cular system to gall bladder pathology we believe depen I upon the latent condition of the heart at the time the gall bladder timulu is et in action

Consulting the literature we found very few allusions to the symptom of respiratory combarrassment in gall bladder die ase. Liene Byn Sole (g) take much for granted when he states. Limitation of diaphragm movement in the presence of certain intra abdominal le sions is well known. There is a casual men ton of the respiratory phenomenon by Mo ni

han Choyce and A. B. John on. Moynthan describing a typical biliary attack, states that the breating is difficult because of spasm of the diaphragim, which like other abdominal muscles is tightly contracted to form that firm muscular splint, the purpole of which is to keep at ret and free from harm the region in need of protection. Choyce speaks of the catching of breath in the more severe varieties of grill stone colle.

Bodenstab (t) analyzing a eries of 500 case of gall stones operated upon either by Quaine or Primsted found that dyspined was pre entin 43 case. He ascribed this phenomenon to a spasm of the draphra_sm which limits its excursion and cause shortnes of breath. The latter symptom has often been mutaken for pleurisy or pneumonia.

Crile in the chapter on surgical physiology in Keen's System of Surgery () writes The reflex phenomena in gall stone colic from a diagnostic standpoint are most interesting There is scarcely a subjective symptom so important as the inhibition of the diaphraem in gall stone colic. The inhibitory paths through afferent nerves supplying the gall bladder region which are located in adjoining se ments of the spinal cord to that of the phrenics to which the impulse is transferred an explanation of this important phenom enon Almost every cale of gall bladder or gall stone colic if que tioned will give thi tory of inhibition of the diaphragm during the attack. The diagno tic importance of this symptom is merea ed greatly by the fact that su h inhibition occur in almost no other in stance. In a per onal communication Crile I can confirm what you have said concerning repiratory phenomena accompanying ob truction of the cy tic duct. Thi symptom a routinely ought for in my clinic at the Lake ide Ho pital

Liencily in Sale in a paper before the section of practice of medicine at the sixty secenth innual session of the American Viedical Association held in Chicago in June 1918 discussed the subject of diaphragmatic contractions as ociated with acute abdominal conditions especially appendictiff. Hi control examination on soldiers in good health and without either thoract or abdominal symp

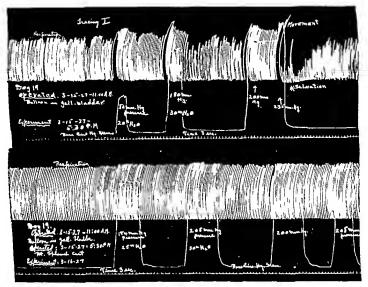


Fig. In the experiment a balloon was placed in the gall bladder. The upper tracin, of this figure shows the effect of distending the fall bladder on repursion. Note the inhibition of repursion and the salisation. If it the upper tracing as made their his splanching are e-wascut. Distention of the gall bladder then caused not symptoms. In some case, after section of the right splanching, we observed some inhibition of repursion and some nausca. Salisation denotes nau ea.

toms showed no difference in the excursion of the two halves of the diaphragm occasionally there was slightly greater excursion on the right side Diaphragmatic limitation was ob served by Sale not only in cases in which the corresponding peritoneal surface of the dia phragm was involved but also in cases in which the pathological lesion was distant Sale's observations are original and interest Similar observations were made by Hubery (4) who found draphragmatic limita tion in a case of gastric ulcer at the œsophig eal junction He speaks of unilateral pecul iar fluffing of the diaphragmatic arcs in abdominal disease and concludes that should these fluffings be present pathology of some kind should be suspected Hughes (5) found cessation of function of the diaphragm on the corre ponding side of the abdominal lesion if the pentioneal surface was irritated by an inflammatory process

The acceptance of the inhibitory reflex obvious to the afore mentioned observers is not quite clear physiologically as the phrenic nerve has no known inhibitory fibers—unless it is due to an inhibition of the motor phrenic center in the cord (Sale). In a discussion of Sales paper J. Birney Guthrie of New Or leans alludes to the diaphragmatic sign as Williams sign. He compares the splinting of the diaphragm in neighboring pathology to the splinting of muscles in chest disease.

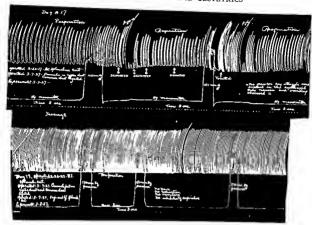


Fig. 3. Then htpl h fth dog sci Fbrury 6 9.7 ON h7th mm bld td blygatd dth yted tc lucd Th pper th the fit f tt fth blyp with the ghpl heet Apin lucd bloom hei pratted lile (use) dmt Thelw th bolt flympum fllw t fth b dlft pl

such as Litten's sign or the fixation of mus cles around joint diseases or the wasting of thoracic muscles in pulmonary tuberculosis

Pottenger (8) in the same discussion clas sifies the diaphragmatic sign as viscerogenetic reflex He states I do not believe that we can explain this reflex through the phrenic nerve It must be through the lower intercostals The phrenics take their origin from the third and fourth cervical segments of the cord and are in reflex communication with afferent impulses which come from the lung. The abdominal viscera however are supplied by the sympathetic nerves which take their origin from the lower 6 thoracic segments of the cord Afferent sensory impulses traveling centralward from the abdominal viscera transmit their impulses to the 6 lower inter costal nerves which supply the intercostal

muscles the central portion of the diaphragm and the abdominal muscles Professor Erlanger likens the diaphragmatic inhibition to that of the abdominal muscles in the vicinity of acute inflammatory processes. In a personal communication Sale accepts the possibility of voluntary inhibition of one half of the diaphragm. The paper of Sale and the discussion thereof are quoted extensively as they constitute the most elaborate document we have been able to find in the literature in support of the phenomenon of diaphragmatic inhibition.

On the whole the diagnosis of the pathologic gall bladder has become as obvious as that of appendictuse especially since the introduction of the Graham Cole test. However, we still meet with disappointments and surpnises and large group climics with excellent climical large group climics.

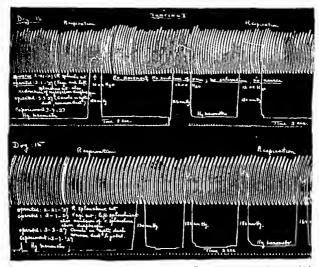


Fig. 4. The right splanchine nerve of this dog vascut on Γ bruary it 1927 and the vagi and left splanchine nerves were cut on March 3. On March 3, the common bile duct was doubly ligated and the existe duct cannulated. Distention caused no symptoms

and laboratory facilities not infrequently miss or mis diagnose pathology of the grill bladder. The presence of respiratory embring rassment associated with an upper abdominal complex has been a valuable aid in the diagnosis of pathologic gall bladder and cystic ducts and has seldom deceived us. It is rather strange that medical literature so prolific on all phases of the subject should be totally silent on the subject.

The scarcity of data concerning this symp tom prompted us to undertake physiological experiments

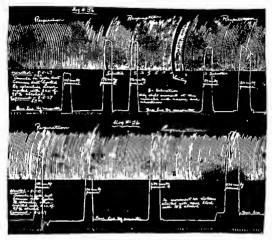
PHYSIOLOGICAL ASPECT

Because of the clinical relationship be tween disease of the biliary passages and the respiratory mechanism noted by one of us (Schrager) we were stimulated not only to study the effect of distention of the gall blad

der and bilinty passage on re piration but also to study the course taken by sensations produced by distention which result in objective symptoms namely inhibition of respiration distress nauser and vomiting and to observe the occurrence of other concomitant phenomena

METHODS

In the experiments in which the effects of distending the gall bludder were studied a toy balloon attached to a hard rubber tube was placed in the gall bladder through an incision in its dome. By a T tube, the tube coming from the billoon could be connected with a mercury minometer for recording pressure. The balloon was distended with water at 59 or 40 degrees centigride a 50 cubic centimeter syringe being used so that the amount of water used could be measured.



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In the experiments in which the effects of distention of the cystic duct and bilary prissages were studed a cannula was inserted into the cystic duct via the gall bladder and tied in place with linen thread. The common bile duct was doubly ligated

The vagi and left splanchine nerves were sectioned just above the diaphragm through an incision between the fifth and sixth ribs on the left side. Care was taken to section all of the branche. The left sympathetic chain was avulsed down to the point where it pas ed under the diaphragm.

The right planchine was cut through a right kidney incision just as it pas es under and below the diaphragm. From two to three other small branche of the right sympathetic

chain given off just below the disphragm were also sectioned

In the experiments in which blood pressure was taken the carolid artery was brought to the extenor by a simple operation prior to or at the same time that the cystic duct was cannulated Only other an esthesia was used Strict aseptic precautions were taken in the operative procedure

Our experiments were performed only after the anuml had fully recovered from the anusthetic 1 e from 6 to 4 hours after the operation each experiment on the same am mal being repeated from 4 to 10 times during 1 period of from days to a week. P espira tion was recorded by a pneumograph tracing Autopsy was performed on every dog

Fig. 6. This figure shows simultaneous blood pressure and respiratory tracing from 3 animals on distention of the biary ducts. The response aried in each animal. On the right of the middle tracing can be seen the effect of vomiting on blood pressure.

RESULTS

Distention of the gall bladder. In these experiments we looked especially for the following reflex mainfestations (1) distress (2) inhibition of respiration (3) salivation which denotes nausea in the dog and (4) comiting

The gall bladder was distended in 2 dogs Of these 2 had the vagi and left splanchnic cut 4 had the right splanchnic cut and 4 had both vagi and splanchnics cut. We generalize in this manner because it is impossible to publish all of our data relative to these experiments



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Our observations on distention of the gall bladder can be summarized as follows (a) Distention of the gall bladder cau es distress inhibition of respiration and occasionally salivation and vomiting. The di tress was not marked when compared with the distress caused by distention of the biliary passage In one dog marked distention (40 milli grams of mercury) of the fall blidder caused The inhibition of repiration no distress always occurred but was more marked in some dogs than in others. It was in most instances inspiratory in type Salivation denoting nausea occurred in approximately 40 per cent of the dogs whereas vomiting only occurred once and then when food was in the stomach That comiting is more readily clicited when the stomach is filled with food or when it is showing hunger contractions has been the observation of one of us (Ivy) (b) Section of the right splanching nerve in 3 dogs abolished all reflexes (c) Section of the vagi and left splanchnic in 4 dogs abolished reflexes for from 24 to 48 hours after which distress occurred on distention. Marked distention with 100 cubic centimeters of water caused distress at all times in these docs

The amount of pressure necessary to cause the inhibition of respiration was less than the amount necessary to cause salivation and distress. The minimal pressure required to clicit reflexes varied widely in different dogs the minimal observed was 40 millimeters of mercury with 30 cubic centimeters of water.

Distintion of the cystic and biliary ducts. In these experiments the water at 30 or 40 degrees centigrade came into contact with the walls of the ducts since a balloon could not be used. The water was injected through the tube attached to the cannula in the cystic duct the common bile duct being doubly tied. The ducts were distended in 8 dogs. Of the e. 4 had the vagi and left splanchine cut. 4 had the right splanchine cut. and 6 had both vagi and splanchines cut.

Our observations may be summarized as follows (a) Distention of the bilary ducts causes marked distress inhibition of respiration usually inspiratory in type salivation or nausea always if the pressure is above 100 millimeters of mercury and frequently vomit

ing It was very evident that the symptoms were more severe and uniform when the bilinry ducts were distended than when the gall bladder was distended Symptoms could be elicited with less pressure the minimum being o millimeters of mercury and 7 cubic centimeters of water (b) Section of the right splanchnic nerve abolished the distress in all experiments and reduced the degree of inhi bition of respiration. The amount of change in inhibition of respiration following right sulunching section varied in different dogs some dogs showing very little change and others showing a 50 per cent change Section of the vagi and left splanchine abol ished the salivation and vomiting and reduced the respiratory inhibition in all experiments The reduction of respiratory inhibition was more marked following vagus section than following right splanchnic section (d) Sec tion of both vagi and splanchnic nerves abolished all reflexes unless the distention was very great (over 300 milligrams of mer curv)

The effect of drugs on the symptoms pro duced by distention of the biliary ducts Pro came instillations From 10 to 15 cubic centi meters of per cent procaine was injected into the biliary ducts in 4 experiments. In from 5 to 10 minutes after the procaine injection dis tention of the ducts elicited no symptoms except in 1 dog on marked distention (40 milligrams of mercury) The effect of the procune lasted about o minutes. The procaine was absorbed very rapidly from the ducts and 2 of the dogs had mild convulsions and one other muscular twitchings from which they recovered After instillation of procaine we observed that from 5 to 10 cubic centi meters more of water was required to produce pressures equivalent to those prior to the instillation denoting a decrease in tone of the biliary ducts

Cocaine hydrochloride subcutaneously One milhgram of cocaine hydrochloride per kilo gram body weight was injected hypodermi cilly in dogs with the cystic duct cannulated and the common duct doubly higated. It was found that this dose of cocaine completely abolished the symptoms crused by distention in two animals and definitely ameliorited.

the symptoms in the other two From 10 to o minutes were required before the drug be came effective. As was the case in procune

came effective. As was the case in procune instillation more water was required to produce equivalent pressures after cocaine

injection than before

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Morphine atropine subcutaneously. From '6 to '/ grain of morphine sulphate and from 1/40 to 1/60 grain of atropine sulphate was injected subcutaneously in from 10 to 12 klodogs whose ducts were prepared for distention. This injection failed to ameliorate the symptoms produced by distention. When the dose of cocaine was added to this dose of morphine atropine the symptoms were markedly ameliorated.

Papa erine sulphate Papaverine sulphate was used in 2 experiments on one dog with

only a slight ameliorating effect

Etter Moderate ether anasthe in a abolished all symptoms. Under very light ether arns thesia the inhibition of respiration could be elected sometimes and at other times not. This is the reason why it was absolutely necessary for us to allow our animals to recover from annesthesia.

Right splanchnic ner e blocked with pro caine After considerable practice in locating and injecting the right splanching nerve in dead dogs we injected or infiltrated the right splanchme nerve of dogs prepared for biliary duet distention with 2 per cent pro aine solution colored with gentian violet This was done in order to ascertain whether or not the pain impulses could be blocked by such a procedure. We found that although we were successful in infiltrating the nerve the distress caused by distention was only pur tially and not completely abolished dog the nerve was blocked under direct vision at operation with per cent procume One hour later (after the animal had recovered from the anæsthesia) distention caused no di tre 5 or inhibition of respiration

Right splanchite nerve blocked with 70 per cent alcohol. The experiments on procume block were repeated using 70 per cent alcohol under direct observation by operative procedure. It was found that the alcohol block completely abolished the distress caused by di-tention of the bihary ducts its action being directly comparable to section of the nght splanchine nerve

The effect of distention of the biliary ducts on blood pressure. Five animals were prepared so that the effect of distention of the bile ducts on the blood pressure could be followed. Thirty four tests were made on the 5 animals.

Our re ults how that distention of the bile ducts changes the blood pressure and heart rate The effect however was not uniform i e in some te ts the pre sure rose in some it fell in others it fell and then rose and in others it became very irregular rose and fell as much as so millimeters of mercury during the period of distention. In dog 40 we observed all of the evanations. In the 4 other dogs (41 42 44 and 45) the usual response was that the pre sure fir t fell 10 or 20 millimeters for 10 or 20 seconds and then ro e 15 or 20 milligrams for from to 2 minutes In 2 dogs the rate of the heart was mereased in the rate was decrea ed and in I (dog 40) the rate was sometimes increased and at other times decreased

In dog 40 distention caused skipped beats to appear which persisted for several minutes after the distention. In 1 dog we transplaced the carotid for a blood pressure tracing prior to the operation on the bile ducts. We did this to determine whether or not the placing of the cannula in the cystic duct and the ligation of the common duct had any effect. The result was negative

Dilution of the biliary ducts from continued intermillent distention. In 3 animals in which the cystic duct was cannulated and the common duct tied and in which the ducts had been distended intermittently for a neek ne observed that the ducts were definitely dilated. The ducts were filled with a solution containing bismuth and a roentgen of the many containing the solution containing the

In attempt to study the effect of cholecystits on the amount of distention required to produce symptoms. It is quite possible that if the gall bladder or ducts were inflamed less pressure would be required to produce symptom than in the case of a normal gall bladder and ducts because partial aspby via and inflam mation increases the irritability of nerve endings

In order to study this aspect a billion was placed in the gall blidder and the minimum pressure required to produce inhibition of respiration and distress was determined. Then 8 cubic centimeters per kilogram body weight of Dakin's solution (pH 90 free chlorine 0 48) I our anim ils were so prepared was injected and injected. The injection killed all a animals within i hours

We are not able to explain the err ults be cause we injected to normal animals with to cubic centimeters of the same olution per kilogram with only i death and have in jected 5 cholecystectomized dogs without a death

We next tried to produce a chemical cholan gitis by injecting acid into the biliary ducts The common duct was ligated and the cystic duct cannulated. After the animals recovered from the anasthesia to cubic centimeters of per eent hydrochiorie acid was injected into the biliary ducts. No immediate dele terious results were observed however the animal died within a hours. Marked changes in the liver were noted

The effect of distention of the biliary ducts on the position of the diaphragm. Since roentgen ological evidence in eases of biliary colic in man revealed that the right side of the dia phragm was contracted (at a lower level than the left diaphragm) we conducted experi ments in order to determine whether or not such contraction would occur in the dog on distention of the ducts

The common duct was lighted and the cystic duct cannulated A roentgenogram was made then the ducts were distended and during the respiratory arrest another roentgen ogram was made. It was found by such an experiment on 4 animals that the right side of the diaphragm was contracted assuming the position seen at inspiration and at a lower level than the left side of the diaphrigm

To ascertain whether or not this was due to the presence of the cannula in the duct or to the abdominal operation we did the follow ing experiment (1) We made a roentgen ogramof the diaphras mat inspiration before the operation (2) then we made a roentgenogram at inspiration after a simple right rectus in cision was made and closed (3) then we made

another at inspiration after the incision was opened and the duct cannulated (4) and finally another on distention of the ducts The results of this experiment revealed that the position of the diaphragm observed in our other experiments was due solely to the dis tention of the ducts

Distention of the stomach and jejunum dog with a gastric fistula and another with a Thirs fistula of the jejunum were prepared The rather sudden distention of the stomach with 550 cubic centimeters or more of water crused some inhibition of respiration followed by an increase. It was not as characteristic as the inhibition seen in distention of the biliary passage in that it was not as sudden and not as complete. The same was true of distention of the Thir, fistula of the jejunum

DISCUSSION

Our results definitely demonstrate that inhibition of respiration on distention of the gall bladder and biliary passages is a definite physiological response. The sensory impul c that causes the effect is carried by the vagi and right splanchnic nerves chiefly by the former Less pressure is required to produce this phenomenon when the cystic duct and other biling duets are distended than when the gall bladder is distended. It is possible but not very probable that the response on distention of the gall bladder is due to distention of the cystic duct as occurs on the improtion of a stone in the neck of the gall bladder and first part of the duct because in our gall bladder experiments the cystic duct was not ligated. We did not ligate the cystic duct because we believed that it was impossible to do this without interfering with the nerve supply of the gall bladder rate it is quite obvious from our experiments that a respiratory disturbance must be looked for in colic due to gall bladder or biliary duct diseases especially if the colic is due to the impaction of a stone in either the cystic or common bile duct

The fact that I dog failed to manifest dis tress or disturbance of any kind when the gall bladder was markedly distended is anal ogous to the clinical observation that the gall bladder of some patients can he markedly the symptoms in the other two Trom 10 to o minutes were required before the drug be came effective As was the case in procaine instillation more water was required to produce equivalent pressures after cocaine injection than before

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Right splanchur nere blocked 4th o per cent alcohol. The experiments on procame block were repeated using 70 per cent alcohol under direct observation by operative procelure It was found that the alcohol block completely abolished the distress caused by distention of the biliary ducts its action being directly comparable to section of the right splanchine nerve.

The effect of distention of the biliary duets on blood pressure. Five animals were prepared so that the effect of distention of the bile duets on the blood pressure could be followed

I hirty four tests were made on the sammils Our re ults show that distention of the bile ducts changes the blood pres ure and heart rate The effect however was not uniform i e in some te ts the pre sure rose in some it fell in other it fell and then rose and in others it became very irregular rose and fell as much as so millimeters of mercury during the period of distention. In dog 40 wc ob served all of the e ariations. In the 4 other dogs (41 4 44 and 45) the usual response was that the pre ure fir t fell 10 or o millimeters for 10 or o seconds and then rose 15 or 30 milligrams for from to 2 minutes. In dogs the rate of the heart was increased in 2 the rate was decreased and in 1 (dog 40) the rate was sometimes increased and at other times decreased

In dog 40 distention cau ed skipped beat to appear which persisted for sec eral amnutes after the distention. In 7 dog we transplaced the carotid for a blood pressure tracing prior to the operation on the bile ducts. We did this to determine whether or not the placing of the cannula in the cystic duct and the ligation of the common duct and the ligation of the sample with the day effect. The result was negative

Distation of the biliary ducts from continued intermittent distintion. In 3 animal in which the cystic duct was cannulated and the common duct tied and in which the ducts had been distended intermittently for a we k we ob erved that the ducts were definitely dilated. The ducts were filled with a solution containing bismuth and a roentgen of the distance of the dis

In attempt to study the effect of cholecystists on the amount of distention required to produce symptoms. It is quite possible that if the gall bladder or ducts were inflamed less pre supwould be required to produce symptoms than in the ca c of a normal gall bladder and ducts because partial asphy an and inflam mation increases the irritability of nerviendings.

In order to study this aspect a balloon was placed in the gall bladder and the minimum pressure required to produce inhibition of respiration and distress was determined. Then S cubic centimeters per kilogram body weight of Dakin's solution (pH 90 free chlorine 0 45) was injected. I our animals were so prepared and injected. The injection killed ill 4 animals within 12 hours

We are not able to explain the e results be cause we injected to normal animals with to cubic centimeters of the same solution per kilogram with only a death and have in jected 5 cholecystectomized dogs without a death

We next tried to produce a chemical cholin gitis by injecting acid into the biliary duct The common duct was lighted and the cystic duct cannulated. After the animals recovered from the anasthesia to cubic centimeters of o 2 per cent hydrochloric acid was injected into the biliary ducts. No immediate dele terious results were observed however the ammal died within i hours Marked changes in the liver were noted

The effect of distention of the biliary ducts on the position of the diaphragm. Since roent, en ological evidence in cases of biliary colic in man revealed that the right side of the dia phragm was contracted (at a lower level than the left diaphragm) we conducted expen ments in order to determine whether or not such contraction would occur in the dog on

distention of the ducts

The common duct was ligated and the cystic duct cannulated. A roentgenogram was made then the ducts were distended and during the respiratory arrest another roentgen ogram was made. It was found by such an experiment on 4 animals that the right side of the diaphragm was contracted assuming the position seen at inspiration and at a lower level than the left side of the diaphragm

To ascertain whether or not this was due to the presence of the cannula in the duct or to the abdominal operation we did the follow ing experiment (1) We made a roentgen ogram of the diaphragm at inspiration before the operation () then we made a roentgenogram at inspiration after a simple right rectus in cision was made and closed (3) then we made another at inspiration after the incision was opened and the duct cannulated (4) and finally another on distention of the ducts The results of this experiment revealed that the position of the diaphragm observed in our other experiments was due solely to the distention of the ducts

Distention of the stomach and jejunum A dog with a gastric fistula and another with a Thry fistula of the jejunum were prepared The rather sudden distention of the stomach with 550 cubic centimeters or more of water caused some inhibition of respiration followed by an increase. It was not as characteristic as the inhibition seen in distention of the biliary passage in that it was not as sudden and not as complete. The same was true of distention of the I hiry fistula of the jejunum

DISCUSSION

Our results definitely demonstrate that inhibition of respiration on distention of the gall bladder and bihary passages is a definite physiological response. The sensory impulse that causes the effect is carried by the vagi and right splanchnic nerves chiefly by the former Less pressure is required to produce this phenomenon when the cystic duct and other bihary ducts are distended than when the gall bladder is distended. It is possible but not very probable that the response on distention of the gall bladder is due to dis tention of the cystic duct as occurs on the impaction of a stone in the neck of the gall bladder and first part of the duct because in our gall bladder experiments the cystic duct was not ligated We did not lighte the cystic duct because we believed that it was impossible to do this without interfering with the nerve supply of the gall bladder rate it is quite obvious from our experiments that a respiratory disturbance must be looked for in colic due to gall bladder or bihary duct diseases especially if the colic is due to the impaction of a stone in either the cystic or common bile duct

The fact that I dog failed to manifest dis tress or disturbance of any kind when the gall bladder was markedly distended is anal ogous to the clinical observation that the gall bladder of some patients can be markedly

distended with stones etc without any symp toms or with only slight symptoms

The contraction fixation or limitation of movement of the right diaphragm observed by us confirms the observations of others The most obvious explanation of this phe nomenon we believe is the one offered by Movinhan namely that it serves the purpose of demobilizing or splinting the diseased part

Our results observed following section of the splanchnics and vagi reveal in a clean cut manner the course taken by afferent sen sations from the biliary passages. Our observa tions on the gall bladder are not so clear cut It is difficult for us to explain adequately why the distress is temporarily affected by section The only explanation that we of the vaga have to offer is based on the difference of threshold that we have shown to exist be tween the gall bladder and biliary passages the threshold of the nerves of the gall bladder heing higher (more difficult to excite) than that of the biliary passages This being the case it is possible for purposes of explanation to assume that the section of the vagi in some unknown manner raises still higher the thresh old of the nerves of the gall bladder and after a day or two the threshold gradually returning toward the normal we again obtain distress on distention. It is also necessary to assume that the threshold of the nerves of the biliary passages is so low (easily excited) that section of the vagi although section of the vagi may have some effect has no material effe t on their threshold or the intensity of the stimulus necessary to stimulate them Just what role the cerebrum plays in the production of the symptoms we cannot state

The fact that muscular twitchings and excitement occurred on the injection of procame into the biliary passages shows that absorption of crystalloids by their mucosa can occur at a rapid rate

Cocaine was administered subcutaneously because Kast and Meltzer (6) found that vis ceral pain is abolished by relatively small doses of cocaine subcutaneously which has been confirmed for the lung by Klestman (7) and because smooth muscle is first stimulated and then depressed by cocaine as well as

procaine The action of the cocaine on the distress caused by distention was much more definite than any effect of the morphine atropine mixture which we believe was nil Our observations show that the cocaine de creases the tone of the ducts as well as ma terially decreases the distress resulting from Our observations we believe warrant the use of cocaine (not more than 60 milligrams or 1 grain subcutaneously) in severe cases of biliary colic that do not respond to morphine atropine provided idiosyncrasy to cocaine is not present in the patient. Our experiments with papaverine were disappoint ing However this drug may prove to be efficacious in biliary colic as it occurs in man

Our results on blocking the right splanching nerve show that adequate methods will produce a block of sensations causing distress due to distention of the biliary passages. In order to obtain complete blocking the splanchnic nerve had to be injected under direct vision When the procaine was injected without direct visualization of the nerve only partial effects were obtained probably becau e a sufficient amount of procaine did not come into direct contact with the nerve

Our results on abolishing pain from the biliary passages by section or adequate blocking of the right splanchnic nerve in dogs confirm the findings in man of kocher Kaffis Kulenkampff which have been re viewed and confirmed by De Takats (3) is not to be concluded from our observations however that pain sensations from other viscera are carried solely by the right splanch

nic nerve Our ob ervations on the effect of distention of the bihary passages on blood pressure and heart rate show that sensation from the biliary passages has no specific effect on the cardiovascular system The cardiovascular system is affected but not in a specific manner We had expected to observe a fall in nre sure and a decrease in heart rate from reflex stimulation of the depressor and vago inhibitor, centers in the medulla variation in response that occurred can be be t explained by assuming that the character of the response depends entirely on the condition of the cardiovascular system at the time

the bihary passages are distended. The fact that "skipped beats' occurred in a dog sup ports this explanation Electrocardiograms were made in 2 dogs before during and after biliary duct distention with negative results

It might be objected that the pressures required to produce symptoms in our dogs are too great to be of any significance. In this connection it should be pointed out that the pressures we recorded were for the most part only approximately correct and that the inflamed gall bladder and biliary pas sages are quite probably more sensitive than the normal since it is well known that in flammation generally increases the irritabil ity of nerve endings

SUMMARY

It has been observed clinically that patients with distended gall bladder or with stone im pacted in the cystic duct suffer from respira tory embarrassment during an attack of colic This symptom has been of much value in the differential diagnosis of diseases of the gall bladder and biliary ducts because it is either absent or not significantly present in any other abdominal complex

Physiological experiments have demonstrated that distention of the gall bladder and biliary ducts causes inhibition of respiration chiefly inspiratory in type Distention also produces other symptoms such as nausea vomiting and distress in proportion to the degree of distention of the biliary passages Distention of the biliary ducts causes more striking symptoms

than distention of the gall bladder alone It has been observed that nausea vomiting and some of the respiratory inhibition are abolished by section of the vagi and that distress and some respiratory inhibition are likewise abolished by section of the right splanehnic

Instillation of cocaine or procaine into the bile ducts temporarily abolishes or ameliorates the symptoms caused by distention this is also true in a ease of subcutaneous injection of cocrine

Blocking of the right splanchnic nerve with procaine or alcohol under direct vision produces results equivalent to right splanchnic section

Distention of the ducts causes changes in the blood pressure and heart rate but these changes are not uniform. We believe that the reaction of the cardiovascular system to dis tention of the biliary passages is dependent upon the functional condition of the cardio vascular system at the time the distention occurs

It was found that intermittent distention of the bihary ducts over a period of r week caused decided dilatation of them further observed that during the respiratory inhibition caused by distention, the right side of the diaphrigm was contracted apparently to serve as a splint

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CARDIOVASCULAR COMPLICATIONS AND THEIR RELATION TO SURGERY!

By LEON ARD G POWYTREE M D MINNE POLIS MINNESOTA F mth D fMd My Cl ith My F dt

HE more I ec of the practice of medi cine the more I admire the healing power of Nature but while my respect for the old time galenicals is diminishing my respect for judicious surgery is becoming more profound. To me the lack of adequate correlation between medicine and surgery seems deplorable. We medical men and surgeons are doing our utmost but too often independently After all we can only offer assistance in the natural processes of healing Our combined resources are often meager enough and should always be pooled for the benefit of the patient There should be no conflict of interest between medicine and surgery for both are aiming at a common end

Most diseases are self hmited—cured by Nature and hers are the secrets that we must learn. How does Nature induce a crisis in pneumonia establish immunity to childhood diseases cruse migraine to disappear in later life control infection stop hemorrhage heal ulcers and arrest the progress of tuberculosis? How does she establish immunity against typhod fever? Our partial solution of thes secrets has unquestionably sived the lives of hundreds of thous indis during the last two decades and further discoveries will make possible prevention and cure of disease such as is undreamed of in our philosophy.

Chronic disease represents Natures failure to effect cure. By knowing her methods and by forethought we can prevent disease and by intelligent aid cure it.

What is wrong with drug therapy Chiefly its limitation and its narrow scope Under certain conditions certain immunits of certain drugs will produce certain effects for certain lengths of time. The duration of the action is usually short and the element of time is therefore important. If sodium intities succeeds in lowering blood pressure for 1 or 2 hours what innumerable dose are taken when the treatment is continued throughout a period of 10 or 15 years! Or take another

example familiar to all of us If sodium bi carbonate relieves the distres of chronic pentic ulcer think of the amount of soda con sumed in the course of o years! Ingenious physicians should be capable of devising a bett r regimen than this But the surgion replies Ah ha! we do better than that we do a gastro enterostomy and thereby permit healing to take place Yes but what of hypertension? What does the surgeon do for it? Ab olutely nothing Having nothing to suggest he calls this a medical disease his attitude is not justifiable. Eventually urgery may be able to offer more than medieine does for hypertension. At least the surgeon should retain a working interest in this field

Drugs are aluable of course Annethetics and antiseptics are indispensable even to urgery in fact they have made modern surgery possible. Others are life aving and health gi and specific remedies drus that relieve distres ing symptoms and tide the patient over a cn is until Nature has had her chance drugs that supply specific deficiencies when Nature has tailed to produce a sufficient amount of her own products Medicinal treatment is most potent when it most closely simulates Nature Recently this has meant the utilization of animal products as well as plant products. Even when we have secured the suitable products we still must learn Nature's secret of supplying them to the body The discovery of insulin was the greate t triumph of modern medicine but this valuable substance is adminitered through a hypodermic needle a crude method compared with Nature s

I have already acknowledged my growing respect for surgery which in the face of great risks in certain conditions undertakes to re move certain offending agents substances tissues or organs in the endeavor to effect a cure. The results as a rule are more quichly realized and are more lasting than those derived from medical treatment. However surgery also has its limitations. When structure are removed the body i deprived of the e-parts and frequently certain processes are not re-established. Surgery is afteonly in certain fields. Its greatest succes depends on the removal of the seat of disease in organ or a part of an organ or on the re-adjustment of mechanical factors. As a rule it is in capable of supplying the demand if under function exists unless underfunction results from mechanical obstruction.

The surgeon having attained a certain de gree of success may be tempted to over emphasize the value of his own work and sometimes to overlook material assistance which the physician or the laboratory can contribute. The viewpoint of the surgion is mechanical organic and anatomical that of the physician is functional physiological and chemical Each viewpoint is important but not paramount. We are all equally guilty all worshippers of Bhal surgeons at the altar of surgical technique and physicians at the altar of clinical and laborators examinations and drug therapy. There is need of better team work of closer association in the treat ment and investigation of disease In the realm of surgical practice closer co operation must depend on the surgeon since such co operation can be developed only at the Otherwise the invitation of the surgeon physician lacks the opportunity no matter how eager he may be to participate in the solution of problems involved in surgery

According to the latest mortality statistics the most frequent messenger of death is heart disease consequently it is a complication which must be daily considered in surgery From the standpoint of physician and surgeon thike diagnosis in this field is fairly accurate Our ideas concerning prognosis are not so well defined But since the prognosis in cardiac disease is of vital importance in both the therapeutic effect and the risk of the operation it merits consideration by every surgeon Information is derived largely from three sources the symptoms the local and general signs and the laboratory data Ex perience from both the medical and surgical sides is obviously important



fig t Extra orporeal loop

CARDIAC DICOMITASATION

CASE 1 The patient was an iderly woman with prolapse of the uterus which has existed since the birth of her seventh and last child 20 years previously. She had suffered from frequent colds marked dysphon at times and considerable ordema.

On examination the heart was found to be very large measuring 17 centimeters in width A diag nosis was made of chronic misocarditis and hyper tension and an electrocardiogram reverled the T wave to be diphasic in leads I and II Treatment consisting of rest digitals and theorin for the support of the heart and the control of the edema a turpine hydrate mixture for the cough and sodium mittie for the control of hypertension was prescribed

Although the patient is now free from addema, she still has dyspincia which is quite marked, even when she is resting. The heart is still greatly enlarged the systolic blood pressure is 220 and the disstolic from and surgical risk continues to be unfavorable Inasmuch as her health does not permit her to be up and about and since the prolipse takes care of itself while she is in the prone position. I concur in the opinion that surgical procedure is for the present unnecessary.

The second case is one selected from the service of H S Plummer who has con tributed so largely to our knowledge of diseases of the thyroid and who is likewise a pioneer in the field of the medical management of surgical diseases

I m has the the seeper to did not the degree of the per to did not the degree of the per to did not the decrease of the many the degree of the

TABLE I —GRAVITA OF VARIOUS CARDIOVASCULAR DISEASES FROM THE MEDICAL POINT OF VIEW ACCORDING TO RISK

Cl ltyp	G vity f	F b g p bly
My c d l ffcency e d c d com p sat n	4t 3	Dyspor ord m cya p po t th py g f patie t d my c d l d m g
P cadts with eff on espe lly in		Degefp dfftfd ae
Mah n thype t		Lf vp t y (er es b t y) t l b l d d l d ce (mpo t nt)
C ro ary scl ro s (dol)		Down of d ablty d my d l damage a sh wn by leet d gram (t 4 p c t f h case o looked by phys)
Coro ry sele v th (a g p t)		Dg ofd bltv ladmy dldm
Syphilt tt m	1	f' mos g d med teatm t a l g
Cereb 1 t cle s c do le cle of k d ey		Imp m toff t adstrut liry g f patie t (m d ff sittl by d t)
Valul de el gedhat	3 t 2	R p se t th py and deg of f ct i d strutral mp rm t (R t may st f t)
Low blodpes stt hyptn ystlp 95 mm 0 l]	S bject t p top at mpl t n ld bj cts
Scle ted ase of temt without		P blty fd bete (t dc t u! art 1 ffi e cy ts)
Pcdt ho sdhe e		Rep to the py my dl tat (odyl t fl t pe cadt)
Pemphe l s lrd R yn d d se B ng s d s e	t	Lwbldpe kllymdt pulm ryemhlt brad
Virular he t d with n rm)	Ag day deltt
Be g hyp te n		Ag fpat t t ct 1 df to lump rment

CASE 2 A married oma 513 ars of age h d suff red from vophth lime gite for 2 ars o mo. Her eight had dropp 1 fm 165 to 1 o pounds Auricular fibrill tion had been pr s nt for 6 months. The ba 1 met bol sm was +6

The patient: 1 as placed in the hosp ial and gi code (Lugol's solut on) on n m 4 tun's a day. The first 5 days the after oon pull va 50 to on the sixh day it as 8 a d the basal m tab lism va +30 Thepule crat du 1 githe cond eck as from; 70 to 85 On the n net att day. Thyrod c tomy vas p r fo med. The 1 urb day after the oper tion auricular fib illati n app r d nd la ted for 4 hours.

With all due respect to the surgical procedure the results in this case were due as much to the medical treatment as to the excellence of the operation. It is interesting to note that the patient's abnormalitie all responded markedly to jodine that digitalise.

was not employed and that the patient stood the operation successfully despite the fibrillation which might have been con idered as a

serious contra indication

In connection with this paper. I have felt
that it might prove helpful to bring together
in a simple way certain medical conceptions
concerning the gravity of the outlook in
various cardiac diseases together with the
surgical risk as we ee it from a medical point
of view. I have also indicated in a general
way the medical treatment. In Table I the e
disease are grouped according to the gravity
of the outlook from a medical viewpoint
while in I able III the vinous types of withy it

The electrocardiograph is important in the consideration of surgical procedure because

mia are considered

TABLE II -IMLORIANCE OF MENTHALL MEDICALLY AND SURCICALLY

= =			,
	(ty f tlook	Te tm t	
Type f by thm	N 1 1	(g de)	1 e tm t
I ttra ystoles	No ride in k pr se	1 to o	As urance bromides quinidine
Paroxysmal tachycardia	North ir kp se	ı to o	As urance pres ure on varus quini dine
Hear block (Complete bundle branch)	(prent l lynhin na year	4 10 3	Le triction of activities digitalis care of pecial manifestations
(Incomplete I un lie bran h)	5 mc hit k	3 to 2	
Delayed 1 1 conduction	(ratif rain) Is great if	4	Atropine determines its nature
Complete heart 11 ck	Crat	4	There it extract barrum chloride
Auricular flutter	to lo so prot Lal vilin	3 to	let digitali quimidine
turicular for flation	40 1 r cent 1 1 vithin 19 m nths	3 to	Pest di itali except in the presence of hyperthyroidi m

it furnishes information of greate t prognostic significance. Striking statistical studie in this field have been carried on by Willius T wave negativity is of great significance prognostically and of still greater significance prognostically and of still greater significance when aberrant ventricular complexes are superimposed. The importance of this is apparent from a study of Table III. Willius has found that oo per cent of patients with T wave negativity have coronary sclerosis or very large hearts (500 grams or more) excessive enlargement of the heart and coronary sclerosis both indicate a very bad prognosis

Relative to general prognosis in cardina disease it is important to determine the incidence of cardiovascular disease from death following operation. I shall present an analysis of the cause of death following laparotomy in 198 cases which was compiled by Robertson from the records of the Mano Clinic for 1926. It will be seen that pulmonary embolism hamorrhaga, and cardina disease taken as a group account for about 20 per cent of the surgical fatalities in this series (Table II).

I shall discuss a few of the more important factors causing postoperative death particularly from the standpoint of the physician's interest and of the advantage of team work. Of necessity I must confine myself to work

with which I am familiar and hence will discuss chiefly studies carried on in the wards and laboratories of my service

IULMONIRY EMBOLISM

In the Mayo Clinic pulmonary embolism accounted for 9 6 per cent of the deaths after laparotomy in 19 6 more than 6 per cent of the postoperative deaths during the last 10 years and for more than 7 per cent of the total postoperative deaths during the history of the clinic. The following case is typical

CASE 3 A woman 58 years of age from the West Indic came to the Mayo Clinic in August 10.7 because of a p lvic tumor Menstruation had censed 2 years before since then there had been a constant vellowish discharge. Three months previously severe menorrhagia appeared and lasted for a week. After that slight bleeding had occurred when the patient walked. At physical examination the patient appeared normal and healthy cervix was small and a large hard tumor was con tinuous with it A diagnosis of uterine fibromyoma was made and on August 11 1 subtotal abdominal hysterectomy bilateral salpingectomy and oopho rectomy were performed for multiple fibromyomata of the uterus bilateral cystic oophoritis and salpin gitis The patient did well until the eleventh day She was sitting in a chair when she suddenly became dyspnœie and evanotic and died within half an hour Necropsy revealed pulmonary embolism probably originating in the left iliac vein There appeared to be no other cause of death

TABLE III -ELECTROCARDIOGRAM IN PROG

	NOSIS	
	G y f tlk	Γ
T gt ty	M d 1 (gr d)	T tm t
In lead I d II I II III	60 per cent dead 4 to 3	Ret d tc
Lad II nd III	sopree td d win 1 yea	Ca fmy ca dum
With addit not QR	86p td d 4 wthn yea	

As a result of the all too frequent occurrence of pulmonary embolism a group of us have become interested in the disease with the hope of finding some method of preventing it or at least of lowering its incidence. A method has been devised for the study of vivithrom bosis in an extracorporeal circulatory loop Figure 1 shows a little apparatus which can be attached to the carotid artery and jugular vein of the rabbit so that the blood will circulate through it The glass parts of the apparatus are connected peripherally by a collodion tube which permits of dialysis This tube is immersed in a solution of sodium chloride if desired or in any solution of any drug or substance capable of permeating the blood stream by means of dialysis method affords an unusual degree of control of physical physiological pharmacological and nathological factors and by its use we hope to be able to throw additional light on the subjects of thrombosis clotting of blood and indirectly perhaps of pulmonary embolism Whereas with this apparatus coagulation

occurs normally in from 4 to 6 minutes it is adelay ed many, hours by the addition of suit able do es of hepann which according to Howell its discoverer is the normal anti-coagulant prie ent in all normal blood. When hepann is used white thrombis are deposited on the surface in the coure of hour de pite the fact that fibrin is not deposited and clotting has not occurred. It is possible therefore by the injection of hepann to control fibrin deposition and when it is given in larger amount and continuously to prevent entirely, the deposition of white thrombis Johnson has been able to show functionally

TABLE IN -- IMMEDIATE CAUSES OF DEAT FOLLOWING LAPAROTOMY

Pe ton us	5	37
B hp um m	š	2
P lm ry embol m	ő	9
Oth pulm ry mplicat n	ć	
Ham he		3 6
Pet tus with boh peum netc	1.5	7
C da d as	0	4
€ conounit	8	4
Hipata ditbics	9	À
Un any d t b s	í	-
Ittald e	7	3
M ellan	o	4
Ttt	108	

active platelets in mammalian blood Thibrin web as well as the platelets are visible on the collodion membrane. This of course becomes the mesh work of the clotting. It is subnormal coagulation such as occurs in jaundice these strings of fibrin are scant to short and apparently ineffective. It is significant that in experimental obstructive jaundice circulation through the apparatus may be maintained for hours and that practically the same conditions can be obtained by the intravenous administration of bile sitts.

In a statistical study of records of cases of pulmonary embolism Henderson brought to fight the interesting facts (Table V) that the initial interest into the interest into the lower abdomen Thus embolism occurred in 75 cases following operations on the stomach tall bladder and bile ducts and in 86 cases following operations on the uterus and its appendages the bladder and the prostate

But according to the frequency of operations a great difference does evit Thus the incidence of pulmonary embolism in operations on the stomach and duodenum or on the gall bladder and bihary ducts is approximate by 1 in 300 operations in prostatectomy it is in 200 cases and in cystostomy preliminary to operation for hypertrophy of the prostrict its 1 in 00 cases. The source of the emboli is obviously important. Table VI shows that the femoral pelvic and prostrict veins are the chief contributors.

Changes occur in the blood subsequent to operation Allen has made a careful study of

TABLE A -- PULMONARY FAIROUSM FOLLOWING
INTRA ABDOMINAL OPERATIONS

Oper tions o	T 1	, m	l rllm f
Call bladder an i duct	11.653		0 31
Stomach	1 4 3	5	0 3
Uteru and appenda e	11 961	1	0 4
Bladder Cysto toms for hyper trophs of pro tate Prostatectoms Operation other than im ple cystostoms	1 104	17	1 0 f 0 4
Colon	2 370	, 0	0 3
Nodomen Exploration Laracentesis	321	1	0 0
Appen for	131	5	0 01
Lidne's	313	1	
Reclum	109	1 5	1 0
Spleen	317	4	1 1 6
Subdiaphragmatic ab cess	9	1	1 4
Omentum (tumor)	2	1 1	0 00
Small bowel	100	1 3	0 10
Sentral herma	1 35	4	0 10

the blood during the 10 days subsequent to operation. It appears that within a day or after operation there is marked increase in the number of leucocytes and a decrea c in the number of erythrocytes and that from the third day on there is a decrease in the total fats of the blood and practically a 100 per cent increase in the fibrin of the blood a ocated with slight decrease in the cougulation time, which is most striking about the sixth day.

Snell has studied the relationship of obesity to fatal postoperative pulmonars em bolism and has concluded that there is a group of patients more than 50 years of age obe c and with normal or subnormal blood pre sure who are particularly susceptible to pulmonary embolism as a postoperative complication Brown in studying a group of 150 cases of postoperative phlebitis found that although pulmonary infarction was relatively common

TABLE VI -- SOURCE OF EMBOIL

	Ces
Iliac vein	6.1
Femoral vein	55
Pelvic veins	43
Pro tatic plexus	iŚ
Vena cava	13
Right auricle	10
Renal vein	
Vullary em	3
I i ht sentricle	3
Ovarian veins	ĭ
Hemorrhoidal veins	í
Deep epirastric vein	1
Jurular em	1
Lagnal plexus	1
Cervical plexus	1
Subelavaan vein	1
Innominate vein	ı
1 vios em	

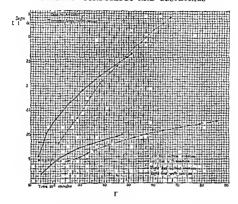
in phlebits fatal pulmonary embolism was extremely rare. An organism capable of in ducing intravascular clotting in animals has been isolated from pulmonary emboli in several instances by Rosenow.

Walters and Coffes have attempted to de crease the incidence of pulmonar, embolism to a regimen involving systematic moving of the extremities. Walters has stressed the importance of the vigor of blood flow and has attempted to strengthen the circulation by the administration of desiccated thyroid prior to operation. In his series of more than 5,000 case there was not a single instance of pulmonary embolism in patients under 70 very of age. Coffes has noted the importance of everci ing the legs and breathing deeply.

Sufficient time has not elapsed to allow definite conclusions to be drawn concerning the efficient of the e-measures however the que tion of pulmonary embolism is one that demands the thoughtful consideration of every surgeon. Pulmonary embolism is always untimely and harrowing to the doctor and to the patient's family. It always appears to be an unnecessary cau e of death and is a challenge to our combined forces.

HI PERTE\SIO\

resential hypertension iffects surgical risk although in the more benign forms it adds little or nothing to the rik in fact at times it may even afford a slight factor of safety because it insures a vigorous circulation



Mali_smant hypertunsion on the other hand is usually fatal within 2 years and con e quently entuls an extremely grave outlook with or without surgical measures. Minor proce es such as removal of teeth and in fected tonsils are hazardous and major operations are unjustifiable except under unusual conditions or when they are undertaken for the relief or cure of the disease itself.

CASE 4 A man aged 34 me to the Mayo Chine thelly bee ue of head ches and hypertension heh had been press nt 1 year and pankes hamatur fo 2 veeks. A dagmost of mail gan hypertension vas made. The blood pressue and fund veetyp cal of mailig ant hyp tension. The electrona dog am confirm of the clical diags of evee myocardial di ac the Twa e be grave ted n leafs I and III. The as no anamin it he mal fuction a adequate Roenig nog rm of th k denys ur ters and bladder egitt. Cyt scopic and pyelographic examin to s ren gait e. The hamatura was apaparently f th so called essential type probably related to the hypertension.

Because of th presence of septic ton ls th flud pus a d in 1 of th fact that the enal st tu was st ll good a tonsille tony a p of rmed Th operat on as follox ed by prof tonsillar bleed sg with the f mat n of a large hæmatoma in one tonsillar f s a The pat ent was extremely ill fo mo e than a cel, fev r was as high as 10 degrees F on the fifth day after operation Recove 3 appeared doubtf I F llo ing tons lleet my the homoglob in dopped to 45 per cent (Darre) and e 3 th coptes to 3 3000 Recovery v as gradual The patient as d sm such about cels after the ope to Ile d d at home 13 months later from ap plexy

In the diagnosis of hypertension and vascular disease information of great value can be denived from the study of the eye grounds and the capillaries. The fundus is diagnostically the polished surface that takes the finger prints of disease and prognostically is Bel shazzar swall whereon the fate of the pritent is frequently written. No other structure of the body of like size affords so much pathog nomonic evidence. The convenient electric ophthalmoscope removes the list evicuse that any physician or surgeon might have for neglecting the fundus examination in cases of vascular disease.

Because of Lombard's investigations the capillaries of the nail fold can now be readily studied. They afford valuable information at times concerning the existence of changes in the capillaries of the body as a whole

Hamorrhage from the capillaries a familiar observation in the fundus of the eve in nephritis can often be seen in the nul folds. These capillaries have been studied for several years by Brown and Sheard and may now be photographed.

What is the cause of death in hypertension? Table VII shows the outcome in a series of cases studied by the late Theodore Jineway who was in his time perhap the outstanding student of this subject in America According to him the most frequent causes of death were cardine insufficiency are maderebral apoplesy and angina pectoris keith Wagener and Kernohan found that in mally nant hypertension cerebral accident was responsible for death in about a third of the cases and that general cardiorenal failure with addema of the lungs constituted the most

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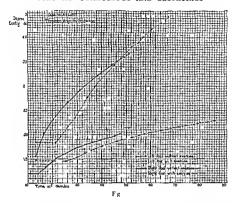
PERIPHERAL VASCULAR DISEASE

Peripheral vascular disease constitutes an other field which co operative studies illumin ate. Brown and Adson are clarifying our

TABLE VII

C e f Ih	M 1	P t	I m 1	Pt	Til
Cradual cardiac in sufficiency Uremic convul ions coma or gradual	48	35 0	12	25.5	60
uremia Cerebral apoplexy or	31	22 6	15	31 9	46
its results	20	116	9	19 1	20
Ingina pectoris	10	7 3	1 "	*, -	10
(I dema of lungs	6	1 4 3	l ı	l 1	
I rogressive anarma		4 4	1 2	4.3	3
Pericarditis	I	0 7		7 5	
Complicating acute infectious disease Other accidental	9	6.6	4	8 ,	13
causes	7	51	2	4 3	9
Unknown	7 25		3		· ·
Sudden	4	9		4 3	6
Total	162		50		I

eonceptions of the cause and nature of pain in the peripheral vascular diseases and incidentally are attempting to save extremities which would heretofore have been sacrifieed by amoutation Brown has measured by the foot calonmeter the heat transferred from the extremity and has also studied the surface temperature of the extremity before and after surgical procedures—sympathetic neuroetomy and ganglionectomy-earried out by Adson He has shown in many instances a marked increase in the elimination of heat from the extremity after operation sometimes amount ing to 200 or 500 per cent invariably accompanied by an increase in local temperature Pain has been satisfactorily controlled in many instances Raynaud's disease of the foot has been practically cured in several instances and excellent results have been ob tained in 7 of the o eases of Buerger's disease in which lumbar sympathetic neurectomy was performed which shows the typical change in the elimination of heat before and after oper ation in suitable cases (Fig 2) In Case 5, amputation seemed unavoidable but com plete healing followed sympathetic neurec tomy and satisfactory conditions obtained at least for a year Healing may be accelerated by the use of vaccines In our experience the greatest relief from this type of pain has followed the intravenous use of vaccines or radium salts



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Because of the p esence of septic tonsil with find pus and in he of the fact that the renal status as still good a tonsillection; was perform d. The operation as followed by profuse tons liar blieding with the format nof a large hematoma in one tonsillar fossa. The patient was extremely ill for

m than a cek se r a as high as roz degrees of on the sist day after operatin Recovery app ed doubtif | Following to silectomy the homoglobin dopp dt od 8 per ent (Dar) and erythrocytes to 3 3 000 Recovery vas gadual The patient vas d'smissed about z we sa after the operation. He died at home 13 months late from an pilety.

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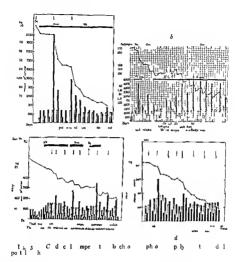
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Brown has established a new criterion for operability in such cases bised on the amount of increase in local temperature of the foot following the induction of fever by vaccines. In unsuitable cases there is no increas in peripheral temperature. This promises to be a practical climical test of dicided surgical value.

Ths 1 as of thr mbo ang t nvol ing b th 1 r tr m ties An a tr velling al Aut n Jevagd 543 ma ame to th M yo Ch compla mng of pa and g at toe 1 b th feet palma arch pain could be entirely r li d by st but so ld r tu naft the pate tw lked blocks E ams a tion of the extremt sh d in both legs int mittent or qu sti bl pul ations n the po t rior t bal and d al p di teris B th popliteal l tio and all pul tons vere l of the r ts With elevation s l showed p l tio pr ent in th

r bor occasioned by leating both feet in the depend

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thr was a lo

ent p it n f r 3 minut s En ly toplic changes epr t n the right gr ti N calcication a e id nt n the e el f the l g on rentgen g phi min ton

A diag is of thrombo ang itis bl terans (B er made Blat | lumbar sympa c) thet ga lon tom a rriel out I ollo i g the op ton the palp ble tempe ature in the f ct in eased In the r ht gr at to with the therm couple m thod a no efom at 204 deres fud The t mp rature f the d rs m of th fot 1 eas df m 91t 308d ge sC The sltn dtrindby the at t h h h at lorimeter b for p rat on the right foot l nm ted o4 cal es fr ch sq r nch of ea nd afte op tion o 60 cal s an in eas f 70 pe c nt The p n the f et dis

apt red ndt overy s n ntil When the patient r to nd a year lat r the lies a hd appa entily rog ss d no further. Thef t t ked quit healthy. The ly ymptom vas a nsation of fat guero the b se of the t s after walking 40 s blocks.

RENAL INSUFFICIENCY AND SURGICAL RISK

Renal insufficiency is not included in the scope of this paper except insofir 1 it is the re ult of renal arterio-clerosis. I unction il te to have developed to such a high degree of accurred that it is now possible in either medical or surgical lesions of the kidney to determine the function of the kidney rde quately and this determination may constrtute the basis for surgical judgment should be remembered that the content of urea in the blood may be controlled it times by diet but the fixed nature of the blood creatmine constitute to my mind at least the be t promostic indication relative to ren il insufficiency. The phenolsulphonephthalcin test on the other hand is probably the most practical and reliable for general use

SHOCK AND GUM ACACIA

Hypotension rarely enuses great concern prior to operation but is frequently important subsequent to operation especially in shock During the World War shock was studied intensively Among other things the value of gum acacia in treatment was established by Bayliss Keith who worked on shock in the British medical service during the War has continued his interest in this problem as a result gum acacia is being used at the Mayo Clinic in postoperative shock. The work has been carried on by Huffman who states In 50 cases of severe postoperative shock marked improvement followed the intravenous use of gum acacia saline solutions. In a number of instances blood transfusion was also used both before and after the acacia The improvement in pulse and blood pressure seemed no greater if as great when compared to the acacia infusion In shock accompany ing hamorrhage the use of the acacia solution will remedy the immediate conditions and permit the replacement of the hæmoglobin in a more leisurely fashion or even make transfusion unnecessary A typical case report follows

CASE 6 A woman aged 47 came to the clinic because of a large tumor in the lower part of the abdomen which had been present for 3 months and was rapidly increasing in size. There had been a loss of weight of about 20 pounds. Hæmoglohin

was so per cent. It was believed that the tumor was malignant. At operation a large diffuse fibro sarcoma was found arising from the posterior surface of the uterus. It was widely adherent so that much trauma and considerable loss of blood from oozing surfaces occurred A profound state of shock super vened evidenced by rapid feeble pulse cyanosis rapid respiration and a blood pressure too low to determine with certainty. At this time administra tion of 6 per cent gum nencia in a solution of sodium chloride was started intravenously Before 300 cubic centimeters had been given the blood pressure had increased to 80 systolic and 60 diastolic and by the time the injection of 750 cubic centimeters was completed the systolic blood pressure was I o and the diastolic to the pulse was slower and full and the vawning practically gone. The improvement was sub equently maintained and the patient made a splendid recovery from the operation

THE ONIGEN TENT IN THE TENTMENT OF PREUMONIA

As already indicated bronchopneumonia and other pulmonary complications account for approximately 15 per cent of the post operative mortality at the Mayo Clinic Overen treatment has been accorded a trial in pneumonia during the last 2 or 3 years The work of Barach Binger and Stadie and Boothby and his colleagues with the oxygen chamber has shown that in the course of a year a number of lives can apparently be sayed by oxygen treatment Binger and Wilder of the medical staff of the Mayo Clinic have been collaborating with Judd and other members of the surgical staff in utilizing the oxygen tent in all postoperative cases in which there is evanosis bronchopneumonia or can illary bronchitis and in a small proportion of the cases in which the postoperative course is febrile The disappearance of evanosis under medical treatment is striking. The al most immediate decrease in temperature which occurs in practically all cases is marked and so far unexplained Our data thus far do not permit of a definite statement how ever the surgeons have encouraged further development of this work the provision of several muchines and a specially trained personnel

CASE 7 A man aged 28 came to the Mayo Clinic carly in January 1927 giving a history typical of peptic ulcer that had existed for vears Because of frequent harmorrhage operation was advised and a posterior gastro enterestomy and appendectomy were performed on January 11 On the same day the temperature rose to 102 5 degrees and the rul e to 120 January 12 bilateral postoperative pneu monia was present with dullness on percussion rales at both bases and bronchial breathing. The roentgen ray examination showed infiltration of both lower lobes Blood culture was negative. The sputum contained streptococcus hemolyticus but not pneumococcus The prognosis was grave The oxygen tent was employed and within 6 hours the temperature cyanosis and pule responded but the oxygen was continued for 10 hours longer There vas a m ld recurrence 8 days later and oxygen was administered for 6 hours on each of 2 days. The nationt recovered completely and was dismissed January 24

THE CONTROL OF CEDEMA Generalized ordema is almost invariably of serious import. Recently our ability to cope with this complication has been considerably enhanced Merbaphen (novasurol salyrgen) has been used in Lurope for several years in the treatment of cardiac cedema. Recently we have been utilizing merbaphen in almost all forms of codema Keith and I found that it was almost as specific in ascites secondary to portal cirrhosis and Banti s disease Keith and his associates have still further increased its value by administering ammonium chloride or ammonium nitrate orally at the same time Figure 3 shows the effects of merbaphen and of these combined diureties in 4 types of cedema associated with cardiac disea e neph ritis portal cirrhosis and polyserositis These results are not only of value because of the therapeutic triumph involved but because they throw some light on the mechanism of the production and on the nature of cedema Irrespective of the organ primarily responsible for the ordema physicochemical changes effected by means of merbaphen have resulted

in its disappearance. The use of the combined dureties has yielded the most satisfactor, results that I have ever encountered in the minagement of ordema. It removes the necessity for paracentesis in many instances and also for omentopery. It constitutes at times a medical tapping

PREVENTION OF CARDIOVASCULAR DISTASES BY URGICAL MEANS

In the general discussion of the cardio vascular complications it is but fair to add that surgery in itself is valuable in the prevention of the development of cardiovascular discase. The early removal of infected tonsil has probably saved hundreds of thousands of heart from the ravages of rheumait in or other forms of infection. The proper circ and when nece sary the removal of infected teeth have probably been a great afegural against subacute bacterial endocarditis. The rimoval of a hyperfunctioning adenomatio ut hyroid gland protects the heart a sainst the effects of hyperthy roddsm.

The best surgery may profit from contact with good medicine As a matter of fact under ideal condition the pre operative and postoperative care of the patient may be handle I best by the intelligent co operation of medicine and surgery so trongly are we convinced of this that several combined medical and surgical ervice have been established in our hospitals. For uccess the spirit must be right. It demand mutual understanding mutual sympathy and mu tual confidence Team work is e sential to optimal results in surgery 1 this can come only on the invitation of the surgeon the future of the movement re t largely in his hands

JUVI NILL I NOPHIHALMIC COLLERS

By All HILL B. M. CRAW, M.D. DITREIT MICHIES S. m. 1 C. 1 D. fth H. 5 I 5 H. pt I

URING the past veir we have had the good fortune to encount r two gotter and in view of the recent report of Din more and Helmholz we have been hed to much of the literature pertuning to juvenile exophthalmic gotter as ha been accertible to us.

Arbitrarily assuming that the term juve includes all patients under a very of age we have found in addition to Din in an and Helmholz's independent error of 46 and 30 cases, respectively reports from a moust countries during the past 75 years of 45 error Thirty nine of the early reports have been seen in the original. The remainder are quoted from Steiner who collected and published 37 cases in 1897, and who earticle is the most comprehensive and searching review of the early literature on this subject that we have encountered.

The two new cases we have to report are is follows

CASE I Exclin D an only child 6 years of age was first seen on December 2 1326 in the out patient pediatric division of the Henry I ard Hospi tal Both parents were living and well. The chill's paternal grandfather was the only member of the immediate family who had had goiter. The child had been a full term of pound baby born spon tracously after a a hourlabor without any ob cryed birth injuries or prenatal abnormalities. There were no immediate postnatal troubles. She was nursed at breast for only a half month because of the lack of mother's milk She was then fed cow's milk and water until she nas 9 months old. No digestive disturbances occurred and she was never finicky about her food She was phi sically normal mentally slightly precocious. As a baby she had always been nervous and her parents thought she was Loing to have St Vitus dance when she was 3 years old as she was very active by day and restless at night The child developed a light case of pertussis at 3 years of age She was vaccinated before she came to the hospital

In the carly months of 19 6 her parents noticed the presence of tachy cardia and a tendency to per spire casily. The patient came down with a sectre case of measles about May 1 19 6. I ollowing the mersles a severe cough and occasional comiting developed and she was taken to the Children's Hos pital Detroit Michigan for about a month. Rest lessness nervousness and irritability were noted As she had always been subject to colds and ton sillitis a tonsillectomy and adenoidectomy were per formed in a elector's office under other anasthesia luring June 19 6 She then lost weight in spite of a ravepous appetite Veryousness restlessness and tubycardin were aggressated and emotional irri-tibility was noted. She was kept at the Children's Ho pital for 8 weeks beginning in July 19 6 I sophthalmos was first noticed during this period and she suffered from otitis media. Beginning in July he was given drops of fincture of jodine in water each day more or less regularly for a months On this therapy she gained a few pounds in weight but otherwise did not improve. During the 2 weeks immediately preceding admission to the clinic all symptoms especially the exophthalmos had in crea ed

I have all examination. On admission to the chair the child weighed 481 pounds she was 4834 inches tall her temperature was 99 8 degrees I pulse 1 5 respiration 24 She appuared to be a reason ably well nourished and developed decidedly hyper active child. The hyperactivity was characterized by the purposeful but useless movements which I lummer emphasizes in contradistinction to the pur po cless character of choresform twitchings I os ture was normal. There was a coarse rapid tremor of hands and arms slight non-tender swelling of the synovia of the left ankle but no redness. The skin especially of the hands was moist. Surface temperature was elevated. Moderate generalized muscular weakness and accelerated fatigability were The knee jerks were hyperactive but the superior abdominal and pupillary reflexes were rela tively normal. There was moderate enlargement of the tonsillar nodes Exophthalmos was present in moderate degree The von Grack Stellwag and Moebus signs were positive There was no nystag The examination of the ears was negative The teeth were normal in number and in good con dition The tonsils and adenoids had been removed the mucosa was relatively normal. The nose had no obvious obstruction. A rather firm diffuse en largement of both lobes and isthmus of the thyroid was noted. No tracheal deviation or evidence of tracheal or resophageal pressure was found. There was no disturbance of phonation. There was a slight bruit but no thrill Examination of the thorax showed equal expansion. No upper mediastinal in creased duliness was detected. The lungs were negative to percussion and auscultation. The heart was slightly enlarged to the left. There were no mur

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PREVENT

In the vascular of that surg vention of disease has problem hearts frother for when nechave prol subacute of a hyteland professional subsecute of a hyteland subsecute

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The be with goo under ide nostoner handled l of medici convinced medical establishe spirit mu understan tual confi optimil re only on the future of t hands

of her three meals by a dictitian and drinks 1½ quarts of milk drily. On cloudy days she is given graded exposure to the ultravoidet Jimp There is just a suggestion of exophthalmos and a slight lag in the lid movements. There is no tramor. The child is still slightly restless but sleeps and exist all and is slowly gaining in weight. We hope to have her report for observation regularly at 3 month in tervals. One year after operation her basal metabolic rate is minus 5 per cent. her general health is good and she appears quite normal as regards the

roid function CASF 2 Dorothy S 7 years of age was born in West Virginia of Iolish parents. On August 12 1927 she was brought to the pediatric department of the Henry Ford Hospital because of cough fever and loss of weight for ro months. Her father and mother were living and well likewise two sisters aged 13 and 4 years and a brother aged 10 years No gotter or tuberculosis was known in the immedia ate family The child was born March 8 1010 De livery was spontaneous at a months after one half hour of labor I ostnatal evanosis lasted for half an hour The child weighed 7/2 pounds at birth \t I year of age the child was able to nail talk and control the bladder and bowels. She fed hers if at a years of age. Her school record had been satis factory Dentition was normal as to time and num ber of teeth erupted but there had been numerous caries of both the first and second teeth. The child had offits media between the ages of 4 and 5 years but not however since a tonsillectomy at 5 2 years of age At 6 years she had German measles and at 61/2 years non suppurative cervical adenitis. The child's diet and general habits were those of the average poor and rather ignorant family

About to months before admission to the hospital the child had a short attack of low fever and ma laise. Since then there had been a progressive loss of weight. In past 3 months she had lost 8 pounds She had a dry cough was nead became tired easily and had headaches and some abdominal pain. She womited only if given medicine. There was no diar thea. The eyes had gradually become prominent She showed an increasing nervousness and a tend ency to cry. The mother had noticed the thyroid enlargement but was uncertain as to its duration. An \times ray picture i month before was said to have

shown the presence of tuberculosis

Physical examination Patient was a pale under nounshed wretched looking child with the faces of exophthalmic goiter. She was hyperkinetic apprehensive and cried easily. Her palms were moist but the skin elsewhere was rather hot and moder ately dehydrated. The muscles of the extremities were poosity developed. There were no bony de formities. A fine tremor vas noted in the fingers. No choreiform movements were present. The spinal contour was normal. The reflexes were present and slightly hyperactive. Examination of the eyes showed a first degree evophthalmos. Ind. lag. and weak convergence. The maxillatives were cloudy and

there was a mucopurulent discharge and marked irrutation and crusting in both nostrils. The examination of the ears was negative. There were numer ous dental caries with diffuse enlargement. No thtill or butt was present. Both sides were about equal in size. The superficial and deep cervical gland showed first degree enlargement. I he axillar and inguinal glands were palpable but not enlarged. The heart was not enlarged. The sounds were tradicting and there was a short non transmitted apical systolic murman. Blood pressure was 110-50. Lyamination of the abdomen revealed slight gaseous distention of the colon.

Laborators findings The patient's blood Wasser mann was a plus (Kalin) and all ooo (Kolmer) The mother's blood Wassermann was negative the

father's was not available

The patient's blood count showed hemoglobin to per cent red blood cells 3 3000 too beaces tes 0 \$500 polymorphonuclears 72 per cent. The unit half sas showed a trace of albumin a normal Benefict some mucus and min leucocytes and epithelial cells. The tuberculin test was positive in 16 hours (o milligrams old tuberculin). The basil metabolic tests were as follows on August 13 plus 23 per cent on the square meter basis and plus 40 per cent on the kilogram basis on August 18 plus 16 per cent on the square meter basis and plus

8 per cent on the sliggram basis on August 30 plus minus o on the square meter basis and plus 10 per cent on the kliogram basis \ ray pictures of the lungs showed enlarged tracheal and bronchial 1) mph nodes and slight peribronchial thickening but no evidence of pulmohary tubergulosis

Treatment The child was placed on a regime con isting of continuous rest in bed restriction of visi tors high calonic diet forced fluids Lugol's solu tion to minims twice a dry by mouth and luminal 14 grain three times a day after meals. The nasal condition was treated externally with a per cent ammoniated mercury ointment and internally by double suction and a o per cent argyrol spray The patient was kept in the hospital for 17 days Her rectal temperature varied from normal to 100 degrees F It was more consistently normal during the last 4 or 5 days in the hospital. Her pulse ranged from 105 to 135 during the first to days and from 00 to 110 during the remainder of her Her general appearance appetite nervous ness and the local nasal condition all improved markedly There was no change in her eyes or in the thyroid gland A subtotal thyroidectomy was strongly advised but the mother refused to permit the operation and insisted upon taking the child home to West Virginia. We have been unable to trace her since

HISTORICAL

The majority of the 50 cases found in addition to those reported by Dinsmore and Helm holz are isolated examples of juyenile exoph

this time

murs or thrills The sound were of good quality and regular but rapid I ulsat on of the carotide vas The examination of the abdomen was nega The genitalia were normal Diagnosis ex ophthalmic goiter

The child was admitted to the hospital December 1926 for further study treatment and probable surgical therapy with general orders for continuous rest in bed liigh caloric diet forced fluids and strict lim tation of visitors. The parents were per mitted to 1 it the child for o ly hours a day Lugol's solution 5 minims was given daily for 6 days luminal 3 grain each day later increased to r / grains in divided doses as al o given

L borat v f dines. Ur nalvs s showed a spec fe gravity of 1 006 reaction cid albumin one sugar none (Benedict) Microscopic examination was negati e A blood count showed 4 00 000 red blood cell hamoglobi 80 per ent leucocytes 7 500 polymorphonuclears 24 per cent basophiles 2 per cent small mononucle s 7 per cent large mononuclears 2 per cent The blood was classed as being in Group IV Blood Wassermann react o was n gative Further analysis sho ed blood s gar 71 milligrams per 100 cubic centimeters non prot in nitrogen 5 2 mill grams per o cubic centimet s The basal metabolic rate of December 3 1026 was plus 84 pe cent An elect ocard ogram sho ed si nus t chycardia a moderate left tric lar p ponderance and mod rate o e acta ty a thout def inite evidence of damage to the myocar hum 1 roents n gram of the tho ax sho ed a slight car is enlargement No enlarg d thymus shadov as s

In the pre operati p ri d the pulse ate aged 130 occasionally rea h g 5 or dropp & to The temperature ranged fr m normal to 100 5 degr es F Resp ration as normal There p actically no improvement in the n r ous manife tations The child slept porly A basal metab 1 sm test on December 1 gr a result of plus 65 per At the end of 2 3 ks th pati nt s ge cral condition was slightly impro ed but not enough to warrant subtotal ther idect my so a ligation f the sun or thyroid art 1 s w s dec ded up possibl advers effect of a th roid tomy upon th child's gowth as allo con dered and d'scussed at

The first op ration D e mber 6 1926 was per formed under ethyl n o vgen æ thesa skin vas prep red ith mer uro hrome (Scott s so lution) and a low ollar ner was made Lach super or thyr id artery as ligated The op ration was complited in 5 m ut ith a small loss of blood Th pul as gul of go d qualty and at rate of 20 to 140 pcr m ute The post pera tive a to as go leept for slight acidosis which was controlled by glueose saline hypoder moclys s

Tollo ving ligation the pulse continued to average 130 beats p m nute for 6 days and on th eighth dropped to an averag of The postoperative t mp rature a 99 5 to 10 degrees The o nd healed by primary union There was very little chnical improvement. The patient was discharged for over Christmas day to try the eff et of rest at home the parents being carefully instructed as to det and general care However wthin 3 days diarrhæs appear d and the patient was brought back to the hosp tal Diarrhoxa as controlled within 24 hours The pulse an I temperature rec ords were practically similar to thos made hen the child was first admitted but after 7 days in the hospital a slight but definite die ea e in pulse rat commenced Ner ous symptoms were on the rease however and a thyroidect my was deciled

up n The sec id ope to a January 8 1927 comprised a subtotal the roidectoms with removal of the 1sth mus under ethylene oxygen a resthesia. The skin was prepared with mercurochrome and the previous inc sion vas re opened. The operat on r quired 45 minutes Each lobe was found to b uniformly en larged to what w s estimated as about four times the normal s z of the gland By far the larger part of each lobe vas removed but the e ect on vas not quite as radic las e ordinar ly carry out on adults The pulse w s r to 30 during the operation and of good quality R lati ly little blood was lost The postoper twe course was better than after the first one att n. There was no cyldence of cidosis The patient was at o ce ab! to retain fluids by mouth For 6 days there yas no charge in the pule but the ristlasm as insom in deye signs e much impro d B ty cen th se enth and the hite nth d y y h n th patient as I charged the puls ate gradually dropped to a livel of 100 to 110 From Januar 4 to 20 she had q te a evere he d c 11 with som in ol ement of the maxillary s uses but not f th ears O January 18 deep ontg ray tr tme tw s gi en o er the thymic area (o by 10 centin eters) at a focal skin d stance inch s for 4 / minutes through 3 m ll meters of luminum filter with a cu rent of 70 kilovolts s milliampere

Since her d sch g f m tle hospital the patient h s gradually but steadily improved. Five weeks fter the ope atto sh eighed 55 pounds pulse vas o8 the basal m tabol sm rate as plus 6 per cent (Lilog am basis) plus 16 per cent (surface area basis) There as ly very slight tremor and vophthalmo and a mark d impro ement in rest I ssn ss and nervou n s After a months her weight as 54 1 u ds puls 74 blool pr ssure 95-70 ba al met bolism rate plus r per cent (surfac area basis) minus 5 per c at (kilogram b s) Ther vas no tremor or eye s gns Restlessn s d nerv ousne s had disappear d Her appetite wa g od and she sl pt vell After 1 months th pule as 88 blool pressue wa roo-60 basal m tabol sm rate m nus 2 pe cent (surface a ea basis) an l minus 7 per cent (k log m basis) The little girl

at present Janu y ro q under ide 1 nd tions n the outdoor department of a Detroit p bl c eh ol She is u der the sup rvision of a nurse is f d two

of her three meals by a dictutan and drinks r 4 quarts of milk daily. On cloudy drivs she is given graded exposure to the ultraviolet lam; I have is just a suggestion of exophthalmos, and a sight lag in the lid movements. There is no trumor. The child is still slightly restless but skeps and eats well and is slowly gaining in weight. We flope to have her report for observation regularly at 3 month in tervals. One year after operation her basel meals bolic rate is minus; per cent her general health is good and she appears quite normal as right of the roof function.

Case 2 Dorothy S 7 years of age was born in West Virginia of I olish parents On August 12 1927 she was brought to the pediatric department of the Henry Ford Hospital because of cough fever and loss of weight for ro months. Her father and mother were living and well likewise two sisters aged 13 and 4 years and a brother aged ro years No gotter or tuberculosis was known in the immediate family The child was born March 8 1019 De livery was spontaneous at 9 months after one half hour of labor I ostnatal evanosis fasted for half an hour The child weighed 71/ pounds at birth At r year of age the child was able to walk talk and control the bladder and bowels. She fed hers if at 2 years of age Her school record had been satis factory Dentition was normal as to time and num ber of teeth erupted but there had been numerous caries of both the first and second teeth. The child had otitis media between the ages of 4 and 5 years but not however since a tonsillectomy at 5 3 years of age At 6 years she had German measles and at 6/2 years non suppurative cervical adentis child's diet and general habits were those of the average poor and rather ignorant family

About ro months before admission to the hospitul the child had a short attack of low fever and ma laise. Since then there had been a progressive loss of weight. In past 3 months she had lost 5 pounds She had a dry cough was weak became tired easily and had headaches and some abdominal pain. She comited only if given medicine. There was no diar those. The eyes bad gradually become prominent. She showed an increasing nervousness and a tend ency to cry. The mother had noticed the thyroid enlargement but was uncertain as to its duration. An X-ray picture r month before was said to have

shown the presence of tuberculosis

Physical examination Patient was a pale under
nourished wretched looking child with the facies
of exophthalmic goiter. She was hyperkinetic ap
prehensive and cried easily. Her palms were moist
but the skin elsewhere was rather hot and moder
ately dehydrated. The muscles of the extremities
were poorly developed. There were no bony de
formities. A fine tremor was noted in the fingers.
No choteiform movements were present. The spinal
contour was normal. The reflexes were present and
slightly hyperactive. Examination of the eyes
showed a first degree exophthalmos. Itd lag and
weak convergence. The maxillances were cloudy and

there was a mucopurulent discharge and marked irritation and crusting in both nostrils. The examination of the ears was negative. There were numer ous dentil canes with diffuse enlargement. No thrill or butt was present. Both sides were about equal in size. The superficial and deep cervical gland showed first digree inlargement. The audilary and inguinal glands were palpable but not enlarged. The beart was not enlarged. The sounds were thudding and there was a short non transmitted apical systolic murmur. Blood pressure was 110-50 Lyamination of the abdomin revealed slight jaseous distention of the colon.

Laboratory findings The patient's blood Wasser mann was I plus (Kahn) and III 000 (Kolmer) The mother's blood Wassermann was negative the

father's was not available

The patient's blood count showed hamoglobin 60 per cent red blood cells 3 900 000 leucocytes 9850 polymorphonuclears 72 per cent The uri nalysis showed a trace of albumin a normal Bene dict some mucus and many leucocytes and epi thefini ceffs The tuberculin test was positive in r6 hours (20 milligrams old tuberculin) The ba sal metabolic tests were as follows on August 13 plus 23 per cent on the square meter basis and plus 40 per cent on the kilogram basis on August 18 plus 16 per cent on the square meter basis and plus 28 per cent on the kilogram basis on August 30 plus minus o on the square meter basis and plus ro per cent on the kilogram basis \ ray pictures of the lungs showed enlarged trached and bronchial lymph nodes and slight peribronchial thickening but no evidence of pulmonary tuberculosis

I reatment The child was placed on a regime con sisting of continuous rest in bed restriction of visi tors high caloric diet forced fluids Lugol's solu tion to minims twice a day by mouth and luminal 14 grain three times a day after meals The nasal condition was treated externally with 5 per cent ammoniated mercury ointment and internally by double suction and a o per cent argyrol spray The patient was kept in the hospital for 17 days Her rectal temperature varied from normal to roo degrees F It was more consistently normal during the fast 4 or 5 days in the hospital. Her pulse ranged from 105 to 135 during the first 10 days and from 90 to 110 during the remainder of her stay Her general appearance appetite nervous ness and the local nasal condition all improved markedly There was no change in her eyes or in the thyroid gland A subtotal thyroidectomy was strongly advised but the mother refused to permit the operation and insisted upon taking the child home to West Virginia We have been unable to trace her since

HISTORICAL

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TABLE I — AGE OF ONSET OF SYMPTOMS
IN SIXTA FOUR CASES

	c	P	t
L that ye to 5 y	3	4	5
6 t őyers tsy		39 34	5
Ttl	64		

TABLE II —AGE OF FIRST OBSERVATION OF

	(P
L thn y it 5 y 6 to	9	. 1
t 53c	35	3

thalmic goiter The first recorded case we found was that of Henoch reported in 1851 Other single cases were reported by Prael in 1857 Labarraque in 1860 Hawke in 1861 Rosenberg in 1865 Demme in 1866 Bouchut in 1867 Gagnon in 1871 and Schwenkendick in 1873 In 1874 Jacobi reported 3 ciscs and a fourth case in 1878 Meanwhile single eases had been reported by Chyo tek Dusch and Gagnon in 1875 and by Sutton and I en Baginsky and Holm each re per in 1877 ported a case in 1879 Crohn reported a ca c in 1883 Baldwin reported 3 cases in 1884 1887 and 1893 Lewin and Mueller each re ported a case in 1888 Ehrlich I case in 1850 Toerster 1 case in 1890 and Demme and Kraus each reported a case in 1891 Steiner observed a case in 180 and 2 cases in 1895 Kronthal I in 1893 Hock I cie in 1895 Lewis 5 cases in 1906 1909 1911 and 1912 Sawyer I case in 1016 Buford I case in 1022 and Heiman 3 cases in 1923 In 1922 Klem mentioned 184 cases of juvenile exophthalmic gorter in a total eries of 34,7 case of Grave disea e but his article lack a biblio raphy and he sometimes full to state whose case compo e his serie

In companson with the immense literature concerning rdult exophthalmic goster reported during the sume period of 75 years the total group of 157 cases discussed in whole or in part in the article while fairly large in it elf doe not seem to warrant any other conclusion than that true Graces or Basedow this

ease is of a distinctly rare occurrence prior to the establishment of puberty

AGE OF ONSET

Accurate data as to the age of onset of symptoms are available in all of Helmholz's 30 crose in 3,0 four composite series of 50 cases and in a single case reported by Och ner The various ages are grouped and shown in Table I

It has been intere ting and surpring to us to nite that the onset of symptoms in the highest percentage of cases including our nunfell between the uges of 6 and 10 years 10 from 1 th 4 years before the werage uge for the on et all puberty in children of northern lattifiels.

Duta are likewise available as to the age at which 64 of the case were his tobserved and are shown in Table II. It will be seen that the highest percentiae shifts over to the period between it and 15 years. There were a case with sudden onset of acute supprisms and cass in which symptoms in ome degree had existed for 6 years before medical advice was nught. The average length of time clapsing between the onset and the hist absention or in year.

ETIQLOCICAL FACTOLS

larious etialogical factor were almost in variably advanced discussed and speculated upon at length in the report of the nineteenth century but not one of the authors of articles published since 1000 with the exception of Heiman, has ventured to de cribe any definite In 62 per cent of the whole serie some pas ible predispoling or chological factor has been mentioned familial goiter in o ner cent of the ca es a recent attack of acute ton illitis in 13 per cent of mea les in 13 per cent of pertussi in 9 5 per cent of scarlet fever in 6 s per cent of rheumatic fever pneumonia diphtheria and malaria each in a per cent of the recent onset of puberty in per cent of recent trauma or emotional strun cach in a per cent and remote trauma in 3 per cent

CONSTITUTION

Some mention is made of the general type or physical condition of 70 per cent of the children but many of the terms u cd are too vague to be of much service. A report of good was made in 6 per cent of the cases undernourished in 3 per cent anamic in 20 per cent nervous habitus in & sper cent rapid growth in 5 per cent raclatic in 5 per cent delicate in a per cent delayed menstruation in per cent scrotulous in 3 per cent and asthenic in 3 per cent. Roughly speaking we can say that exophthalmic goiter appeared in an otherwise healthy sturdy child in only one fourth of the cases, and second that exanthemata and acute upper respiratory infections probably play the same predisposing role that they do in regard to the acquisition of various other diseases of later childhood

SYMITOMS AND PHYSICAL SIGNS

The four cardinal signs or symptoms of Graves disease are gotter technoration exophthalmos and tremor these may be present in any degree and grouping, and any two or three symptoms may though rarely be absent. In 34 of the 50 cases, some mention of these cardinal symptoms was made is shown in Table III.

Of the four eardinal symptoms those relating to the heart have received the most consistently detailed observation. Some cardiac sign or symptom is mentioned in each of the 50 case reports. In 5 cases no mention was made of the heart rate. In of the 45 remaining cases normal pulse rate was specified. In 11 cases either tachy cardia or pulpitation was mentioned and of the 33 cases in which ipulse rate was reported none was below 100 beats per minute. It therefore seems reason able to expect tachy cardia in from 90 to 95

TABLE III —SEQUENCE OF CARDINAL

		SYMPTOMS				
1st symptom	Gι	L phih îm	T	hy	ď	T m
noticed nd symptom	9	8		7		3
noticed 3rd symptom	6	5		5		0
noticed 4th symptom	8	4		3		2
noticed	0			4		

per cent of eases of juvenile evoplithalmic guiter

Other cardiac symptoms were mentioned as follows

C 1 ymqtm	l 1 f
Heaving precordial impul e	30
I plargement of the heart	6
I ulsating cervical veins and arteries	6
Murmurs	22
Werk pul c	12
Accentuate I s cond soun I	8
frr mular pul c	6
1 hrills	6
Bruit	4
Heart failure	2

These percent these should be taken only as a general indication of the relative incidence in heart symptoms and signs because the various abserves probably did not note the presence or absence of symptoms with equal care and precision

Throid enlargement as might be expected was present in 100 per cent of the cases. In only 1 per cent however was the gotter definitely described as a marked onlargement. In 4 per cent it was reported as smill. In 30 per cent, the right lobe was noted as being larger than the left in 4 per cent as being smaller.

Exophilialmos was reported as present in 96 per cent of the cases and as marked in 2 per cent. In only 4 cases was reference made to a difference in the degree of exophthalmos in the two eyes. The issociated eye signs of idlat, (von Graefe) undened apertures (Stell wag) and weakness of convergence (Moe bius) were mentioned in so few of the reports that to give the percentages would be entirely misleading. In 1 case Gagnon's the exoph thalmos was severe enough to produce kera titis and corneal ulcer. This also was 1 of the 2 cases in the series with fatal termination.

Digesti e symptoms were observed in only a few cases. Vomiting and anoresta were each noted in 4 cases polyphagia diarrhea and excessive flatus each in cases epigastric pressure in 1 case.

The only respiratory symptom mentioned with any frequency was dyspners on exertion

in o per cent of the cases

Some ner ous or psychic symptom was men
tioned in 7 of the 50 cases but aside from

TABLE IN -RESULTS OF DIFFERENT TYPES OF TABLE V -RESULTS OF DIFFERENT TYPES OF OPERATION D no

	Тэре	Ŋ mb	C mpl t	m dP tal N	h g	W
L gat	n ly	3	3	0		
P hm	n rylg	t n	0		1	
	elb t	my				
	rlgto			0		
	lb tom	ıy				
fte	r l gatio		1		0	•
	ryd bk	•				
	ct my	2				•
Total	p tio	s 9	7			•

the report of tremor in 18 irritability in 16 and insomnia in 4 cases there is a surprising lack throughout the whole series of case re ports of systematic evaluation of the nervous system Almost all of the individual signs and symptoms we are accustomed to look for such as restlessness crying fatigability increased reflexes quadriceps weakness etc were men tioned once or perhaps twice but not oftener

The same indifference characterized the re porting of skin symptoms but it is of interest to find vitiligo reported in cases patients were 12 years of age

In the group of 50 cases which we have been considering the basal metabolic rate ha been mentioned only in the 3 cases reported by Heiman and in our 2 case Helmholz however in his series of 30 cases gives excel lent tables of the pre operative and po topera tive metabolic rates Heiman s 3 cases showed rates of plus 12 per cent plus o per cent and plus 5 per cent respectively before on eration Ours showed highest rates of plus 80 per cent and plus 40 per cent

TREATMENT AND ITS RESULTS

Excluding consideration of the series of Dinsmore and Helmholz definite notes on treatment were given for only 20 cases and of results in only 38 of the 50 eases Thyroid surgery was resorted to in 9 cases and con sisted of a ligation of the superior thyroid arteries alone in 8 cases a single lobectomy preceded by a ligation in reve a double lobectomy preceded by a lightion in I case a primary single lobectomy in case and a primary double lobectomy in 3 cases None of these 9 cases was made wor e by surgery I case showed no change following ligation

MEDICAL TREATMENT

Fmlt tmt N	í es	Вt	N h ng	W
Ilt ty	8	4	3	
D _b t hs	6	5	_	
Iod	4	.3	0	I
Ars n				1
Pt m ld				
II h lodt				
T II t my				
Qu in				
Iro				0
\ ton				0
R t				
Ic b gs St 1				
St 1				
* .				

and the 8 others were either partially or wholly improved \ tabulation of operative

results is shown in Table IV Turning to methods of treatment other than

thyroid surgery a large and interesting vari ety is encountered Eight ca es were treated by ome form of electric current all before The drug most frequently used was 1887 digitalis and it was employed in eases re ported a early as the 70's Iodine curiously was used in only 4 of the group of 50 cases including our own but it was doubtless used in many or all of the series of Din more and Let likewic wa specifically Helmholz eited in only i ca e but here again it is safe to assume that in nearly all of the 50 eases rest in some degree was employed without perhaps a due appreciation of the large role it was probably playing in the patient's im provement. It is interesting that in 2 cases in which ton illectomy was tried as a pallia tive measure in full knowledge of co existing hyperthyroidism the resulting condition was worse rather than better In Table V the various forms of treatment and re-ults ob tained are shown Most of the drugs listed were used in combinations of two or three

SUMMARY AND CONCLUSIONS

In any report of a case or group of ca es the late re ults almost always rank first in fundamental interest and importance To fol low patients and convince them of the value of returning for periodic examinations over a period not only of months but of years is slow and often seemingly thankless work yet what an invaluable set of data we would have if we could only know the subsequent climeri history of every one of these children and the effects of the early hyperthyroidism! How many of the patients who were not operated upon and have had spontaneous remissions had recurrences in later life and how many of these recurrences were in the form of adenomatous or parenchy matous goiters? Did thy roidectomy have any apparent adverse effect on the growth development fecundity etc of the prtients? In one of our own cases we feel that we have enlisted the co-operation both of the parents and patient and shall make every effort to continue our observa tions in order that a subsequent report may be made after a period of years

In addition to stressing the importance of ascertaning and reporting late results we also wish to urge a certain uniformity in reporting cases as infrequently observed as these and to suggest that the schema of Stenier be used as a framework on which to build such reports so that the early case reports can be included. Certain data such as basal metabolic studies details of operative procedures electrocardiagraphic studies etc will of course have to be added. Only by pooling our observations of such arise cases as these can we eventually obtain reasonably re liable statistical data to help us form con clusions rather than opinions.

What finally are the opinions we have reached from the observation of our own and the cases we have gathered together from the literature? First juvenile hyperthyroidism is apparently identical in its symptoms course and response to treatment to the adult syn drome known as evophthalmic goiter Second cases of juvenile hyperthyroidism are in the present state of our knowledge primarily sur gical problems and the sequence of events in their care should be rest the administration of rodine operation rest and observation under surgical supervision. Third while we doubt that polar ligation of the superior thy roid arteries is a sufficiently radical procedure to insure a permanent recession of symptoms we feel that one should be a shade more con servative in the relative amount of thyroid tissue left behind at operation as compared

with that left in cases of adult exophthalmic goiter—even risking the necessity of subse quent re operation until we have some accurate data on the effect of subtotal thyroidec tomy upon human growth and development

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THE SIGNIFIC NCE OF MUCUS-FORMING CELLS IN CARCINOMA OF THE FARGE INTESTINE AND RECTUM¹

BY NOUNT C OCHSLAHIIT MD I C EST R MINNL TO

UCUS is a vi cid sticky secretion produced by the goblet cells of mucous membranes and by mucous and and cubodal epithelial membrane such is line the re-piritory and gristro intertual tracts (11) and in the mucous gland of the extracts in the saliva from the mucous secreting glands of the mouth such as the submarullary and sublingual glands and the mucous gland of the tongue in the bile from the mucous gland and the goblet cells of the mucous membrane of the large bile ducts in the gall bladder from its mucous gland and in

the unne (6)

In the large inte tine mo t of the cell of
the epithelial surface and the mucous glands
are gobiet cells. Yucus is lud down within
the e cells in the form of granules or globules
of mucigen. The e granule c entually swell
up to form globular misse which clump
together and greatly distend the part of the
cell neare t the free border and are extruded
as mucus. The e gobiet cells or mucus
secreting, cells are not mere temporary
modifications of the ordinary columnar epi
thelial cells but are permanently differen
tated cell. After discharging their mucus

they again form a fresh supply (11)
Bizzozero found that the mucous cells as well as the protoplasmic cells an e from un differentiated elements but in the embryo only the protoplasmic cell is present the mucous cell arise from a later differentiation

Sacerdotti found that mucous cells differ entiated early in the embryo of 1 cow. In 3 5 centimeter fetus he found certain cell groups beginning to form and surround a mucus containing ca ity and in a 7 centimeter fetus he found mucous cell in the rectum and 1 few in the duodenum and ileum

In 3.7 month fetus he found well developed glands everywhere and the epithchum cylin dreal often changing to the goblet type. Observations concerning the rectum were similar

Von der Leven did not find goblet cells in which mucus could be demon tratid in the colon of a 27 centimeter fetus but they were numerous and distinct in the newborn and in their children.

By cellular differentiation 1 meant the structural changes which take place in the evolution of an adult to us cell (7)

The conception that the presence of cellular differentiation is unfavorable to the continued growth of carcinoma cells is based on the unwritten law in general biology that the power of cellular production is inversely proportional to cellular differentiation. If the law is correct carcinoma cells which show partial differentiation must of ne essity grow less rapidly than carcinoma cell without differentiation. (1)

Robertson states that the appearance of mucus droplets in cell of growths arising from any glandular epithchal structures 1 a differential characteristic that it is quite evident that the mucus producting epithchal cell is a differentiation and growths from these cells return with exceeding tenacity this particular characterization.

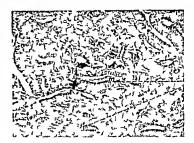
The cell of a neoplasm that show practically no tendency to control themselves rapidly infiltrate the adjacent structure and by utilizing the valcular system as a mean of metastasis set up colonies in various parts of the body which in turn keep on producing their own kind of cells hin illy with fatal realt. On the other hand if the cells of a neoplasm show a marked tendency to control them elves by differentiation the neoplasm will grow slowly and show very little tendency to metasta use (4)

Carcinoma that arises from the regenerative cell of aland or secretory epithelium should be termed adenocarcinoma or gland carcinoma 1 t h t b h b t m or t p h 1 l f lilling h b q

Fi 1 Collad carcinoma of uscending colon graded 1 with mucus formation graded 4. Vost of the cells show mucus formation with much mucus alon the edge of the acmin and distention of the acmin with collon material stain in, lightly with mucus stain m. Some darker tuning mucus material is su pen led in the colloid. The mucus stains red the remaining, tissue blue. Mucicarmine stain piece and accete acid baxion. ×60

because whenever differentiation take place it is usually toward a glandular or secretors type of epithelium. Carcinoma of the large into tine and rectum are nearly always adenocarcinoma with a tendency toward the formation of mucus. The mucus originates in the epithelial cells of the carcinoma Droplets of mucus are seen arising within the cytoplasm of epithelial cells of the goblet type and in adenocarcinoma mucus is found within the actin. Epithelial cells containing these droplets can practically always be found in the immediate vicinity of extracellular mucus.

In this study sections were made from 188 cases of carcinoma of the large intestine and The sections were taken from fre h operative specimens and from pathological museum specimens which had been pre erved in 10 per cent formalin for from months The sections were fixed in alcohol and acetic acid when received at the time of operation and in picric and acetic acids when obtained from the museum (5) sections were stained with mucicarmine according to the following technique fix fresh specimens in alcohol and acetic acid for 24 to 48 hours fix older specimens (pre served in formalin) in picric and acetic acids for 24 to 48 hours (2) wash in running tap



I sg. 2 Section from adenocateinoma of rectosi moid graled 2 with mucu formation graded 3. Mucus is seen in many of the cell a large and small globules and all of along the free surfaces of the cell and in the acini 1. Muccarming stain potent and acetic acid fixation ★60.

water for 24 hours (3) dehydrate in 80 per cent alcohol for 6 hours (4) dehydrate in 95 per cent alcohol for 4 hours (5) dehydrate in absolute alcohol for 6 hours (6) place in equal parts of toluol and paraffin in an oven at 32 degrees C for 1 hour (7) embed in paraffin in an oven for 2 hours (8) cut sections about 8 microns thick (o) stain with alum hema toxylin for 3 minutes (10) decolorize with acid alcohol (11) immerse in an aqueous solution of lithium carbonate for 2 or 3 minutes to bring out the blue color examine the section under the microscope to determine the depth of the strin at this strge (12) wash in water (13) stain with mucicarmine for from 10 to 20 minute examine under the microscope to determine the depth of the stain and the length of time of staining nece sary to make the differentiation clear (14) rinse in water (15) dehydrate in 95 per cent al cohol (16) clear with acetone for 5 minute (17) clear with carbolyylol composed of r part of phenol crystals and 3 parts of vylol (18) clear with xylol and (10) mount in Canada balsam The mucicarmine stain deteriorates rapidly and must be freshly pre pared every few days. It is prepared in the following manner

A mixture of carmine 1 gram aluminum chloride o 5 gram and distilled water 2 cubic centimeters is heated under a small flame for

THE SIGNII ICANCE OF MUCUS-FORMING CELLS IN CARCINOMA OF THE LARGE INTESTINE AND RECTUM¹

B NORMAN C OCHSI NIIII T VI D P C1 LR MIN L 4

UCUS is a vi cid sticky ecretion produced by the goblet cell of mucous membranes and by mucous glands. It is found in ilmost all cylindrical and cuboidal epithelial membrane such i line the repiratory and a satro into tind intents (ii) and in the mucous glands of the etracts in the saliva from the muci secreting gland of the mouth such as the submirullary and sublingual glands and the mucous plands of the tongue in the bile from the mucous membrane of the large bile ducts in the gall bladder from its miccous glands and in the urine (6)

In the large inte time mo t of the cell of the epithelial surface and the mucous glands are goblet cells. Mucus 1 Pind down within the e cells in the form of granules or globules of mucigen. The e-granule eventually well up to form globular masse which dump together and greatly distend the part of the cell neare t the free border and are extruded as mucus. The e-goblet cells or mucus secreting cells are not more temporary modification of the ordinary columnar epithelial cells but are permanently differentiated cell. After discharging their mucu they again form a tresh uppls (11).

Bizzozero found that the mucous cell as well as the protoplasmic cells are e from un differentiated elements but in the embryo only the protoplasmic cell i pre ent the mucous cell are e from a letter differentiation

Sacerdott found that mucous cells differentiated early in the embryo of a ow. In a 35 centimeter fetus he tound certain cell groups beginning to 15mm and surround mucous contruining cavity and in a 7 centimeter fetu he found mucous cells in the rectum ind a few inth duodenium and ileum

Bigin ky discovered in 2.4 month human fetus that there was slight formation of glands in the colon but that the mucous membrane was composed of flat epithelium Ab d m f h b m d h T 1, t h C 1 S

In a, month fetus he found well developed glands everywhere and the epithelium cylin drical often changing to the goblet type. Observations concerning the rectum were similar

Von der Leyen did not find goblet cells in which mucus could be demonstrated in the colon of a 1 centimeter tetus but they were numerous and distinct in the newborn and in older children

By collular differentiation is meant the tructural changes which take place in the

cvolution of an adult tissue cell (7)

The conception that the presence of cellular differentiation is unifavorable to the continued growth of carcinoma cell is based on the unwritten law in general biology that the power of cellular production is inversely proportional to cellular differentiation. If the law is correct car inoma cells which show partial differentiation must of necessity grow less rapidly than carcinoma cells without differentiation. (12)

Robertson states that the appearance of mucus droplet in cells of growths ari ing from any glandular epithelial structures is a differential characteristic that it is quite evident that the mucus producing epithelial cell is a differentiation and growths from these cells retain with exceeding tenacity this particular characterization.

The cells of a neoplasm that show practically no tendency to control themselves rapidly infiltrate the adjacent structure and by utilizant, the vascular system as a means of metastasis set up colonies in various parts of the body which in turn keep on producin their own kind of cells finally with fatal result. On the other hand if the cell of a neopla m show a marked tendency to control themselves by differentiation the neoplasm will grow slowly and show very little tendency to matasta ize (1).

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graded 3 th m f rm t ge d opl t th ery lttl th c d et keddiff cdf. t t fth t

minutes and then made up to 100 cubic centimeter with 50 per cent alcohol. It is then ready for use Mucicarmine stains mucus and mucus containing tissue a vivid red in marked contrast to the surrounding tissue which is stained more or less blue



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Each case was graded microscopically by Broders according to his method of grading malignancy and a system was devised for the purpose of grading the number of mucus forming cells in carcinoma of the large in te tine and rectum (Table I) Mucus was graded 1 when from practically none to 5 per cent of the cells seemed to be involved in the secretion of mucus as evidenced by the mucous globules contained in the cell and the mucus extruded therefrom and lying in the im

TABLE I -COMPARISON OF THE GRADING OF THE AMOUNT OF MICES TO THE MALIG NANCY IN ALL CASES OF CARCINOMA

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mediate vicinity of the cells along its free border graded 2 when from 25 to 50 per cent of the cells were producing mucus graded 3 when from 50 to 75 per cent of the cells were producing mucus and graded 4 when from 75 to 100 per cent were producing mucus

Table I shows that in almost all of the case the percentage of mucus secreting cells is inversely proportional to the grade of milignancy. This conforms to Broders basis of grading malignancy on cell differentiation the formation of the secretion of mucus being evidence of differentiation (Figs. 1 to 4)

The so called colloid carcinoma is an ex ception There were 22 colloid carcinomata in this series (Table II) In the less malignant type of colloid carcinoma there does not seem to be an increase in the number of mucus forming cells as compared to those found in an adenocarcinoma of the same grade However the amount of mucus is increased as the stain ing indicates This is probably due to in creased activity on the part of the mucus forming cells The acini are greatly distended and contain colloid like material which takes the mucus stain poorly or not at all This colloid like material contains small suspended particles which take a typical mucus stain and appear to be true mucus Wells believes that the mucin of colloid carcinoma of the gastro intestinal tract is the same as normal mucin from the same source thickened by partial absorption of water from the pressure of retention in a closed cavity and mixed with larger or smaller quantities of other proteins derived from cell degeneration or from vascular exudates In colloid carcinoma

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CONCLUSIONS

I he presence of mucus in carcinoma of the large intesting and rectum is the result of partial differentiation of the carcinoma

The more malignant the carcinoma or the less the extent of differentiation the less numerous are the mucus secreting cells and vice ver a

3 The number of mucus secreting cells in the carcinoma is inver elv proportional to the grade of malagnance

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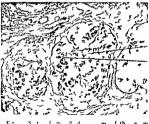
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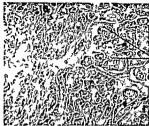


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VAGINAL HERNIA

BY JAMES C MASSON M D FACS AND HAROLD E SIMON M D RCC E TER MINN OTA

PORTION of the abdominal contents which pushes a peritonical sac through an opening in the pelivic floor and presents it elf in the vagina constitutes a vaginal herina. The condition is very tare and i frequently not recognized clinically. Often only after the failure of one or more attempts at the surgical repair of a supposed existocele or rectocele, is the true nature of the condition discovered.

Five cases of vaginal herms exclusive of the postoperative type have been observed at the Mayo Clinic and have been made the basis of this discussion

LIFERATURE

The number of cases of vaginal hernix reported in the literature is surprisingly small Among the first case reported according to Barker and Sweetser is one by Garengeot in the early part of the eighteenth century and another by Sir Astley Cooper in 1804 Sweetser in 1919 reported one case and dis cussed the occurrence and the various types of vaginal hernia. He also considered in some detail the differential diagnosis. Miles in 1026 in a critical review of the literature analyzed 9 cases which had been reported with sufficient detail and accuracy to make them of value and to these he added the reports of 2 cases which he had observed personally He discussed the various types of pelvic hernia and suggested an excellent classification of them on an anatomical basis

CLASSIFICATION

In Miles classification all hermis which pass through the pelvic floor are classed as pelvic hermas. These are subdivided according to their point of egre s pudendal hermas present in the labia perineal hermas in the perineum and vaginal hermas in the vagina.

Miles has subdivided vaginal hernia into the interior and po terior varieties depending on the relationship which the sac bears to the uterus He does not group postoperative vaginal hernias separately. They form a ditinct type and should be included in a third subdivision in this classification.

CASE PEPORTS

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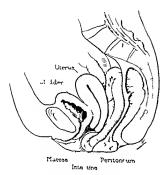


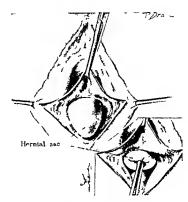
Fig. 1. Longitudinal ection through the plansh a potenior vaginal hernix

diameter which pushed the posterior vaginal wall forward. The rectum formed part of the mass but when this was pushed back the major portion of the mass remained.

A two stage operation was performed. The abdo men was opened through a low median line incision and the uterus was firmly fixed to the abdominal wall. Appendictions was also performed. Three weeks later a posterior vaginal flay was dissected high up and the hernial sac isolated and opened. Its contents, loops of the small intestine the rectum and the sigmoid were replaced in the abdomen. The excess portion of the sac was resected and the opening into the abdomen was closed by a spiral suture. I erincorrhaphy was performed in the usual manner. Convalescence was uneventful. I elvic examination at the time of dismissal disclosed no bulging of the posterior vaginal wall.

Case 4 The patient a woman aged 30 bnd children aged 8 and 10 years respectively. I ight years previous to examination an operation for a supposed prolapse had been performed and the uterus fixed to the anterior abdominal will. The symptoms recurred as soon as the patient stood up Since then the condition had become progressively worse and for 4 years a mass had protruded beyond the vulva.

Examination disclosed a complete uterine prolapse and marked cystocele. There was a large mass about 25 centimeters in diameter which pushed the posterior vaginal wall forward and protruded from the vulva. The retrum could be isolated from this mass. A diagnosis of complete uterine prolapse with marked cystocele and rectocele and posterior vaginal hernia was made and an operation was advised. A Mayo vaginal hysterectomy was per formed and both tubes and the left ovary were



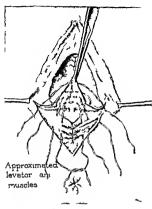
his. Hernial sac a in appear after the elevation of the potential stage and the potential stage.

removed A plastic closure was made completely obliterating the vagual canal by lateral approximation with interrupted sutures of chronic catgut Convilescence was uneventful and the patient was dismissed with the wound healtd

Civil 5 The patient is woman need 57 had been mered for 31 years privious to examination at the Mayo Clinic. She had had 3 children and 1 mis carring. Following the birth of the youngest child in 1904 a profrusion from the vagina appeared which was noticeable when the patient strained or stood but which disappeared which she by down In 1906 the left overs and the appendix were removed and internal shortening of the round ligaments and perineorrhiphy were performed. Three years after this operation than had been recurrence of the protrusion so marked that it interfered with walking. In 1913, the kocher operation for prolapse, was performed but 3 months later the protrusion suddenly reappeared and since then has gradurilly grown larger. There had been backabe at times

On examination in 1927 the uterus was found to be in good position but there was extensive bulging of the posterior vaginal wall more marked when the patient stood. The perineum was in good condition At operation a flap was dissected free from the posterior vaginal wall and from a thin walled size extending down in the median line along the antitrior wall of the rectum this sac was identified as pur toncial. It was apparent that the protrusion was caused by a posterior vaginal hermin. There was very little rectoecle. The sac was dissected free as far up as possible and a high perincorrhaphy per formed below it. The abdomen was opined and the

Hernial sac

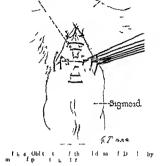


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hemil sac hich was potert to the uterus a dem rged though or open de litto the cul de sac of Douglas vas verted and sutur d to the posteno surface of the wall of the uter y. The cul de sac was obliter ted by a sense of purs sting sutures and the operation complet d by suturing the uter when the thing the double of the doub

SIMPTOMS AND DIAGNOSIS

The symptoms of vaginal herma are not characteristic and frequently, do not sugge t the correct diagnosis which may not be made until the peritoneal sac is discovered when the flap of vaginal mucosa is dissected upward preparatory to perineorrhaphy. The patient has usually been pregnant but may never have borne children. The pre ence of a mass inside the vagina or protruding beyond the vaginal orince usually causes the patient to seek, medical attention. The symptoms frequently date from a severe strain or childburth and the mass tends to become progressive flarger. Unless complicated by adhesions



Uterus

stringulation or the pre ence of a neoplasm the herma reduces spontaneously when the patient lies down but promptly recurs on coughing straining or standing. When the herma is large it may interfere with walking

Frequently one of several surgual attempts have been made to correct the condition. However if its true nature has not been recognized which is often the case and it has been treated as a cystocide or rectocide in promptly recurs when the patient first stand. Recurrence under these circumstances is the most suggestive symptom of which the patients may complain.

On superficial examination a vaginal hermia is not readily differentiated from a rectocele or a cystocele but a more careful examination will usually reveal its true nature. In some cases the perineum is normal but since the majority of the patients have been pregnant a number of times there is usually relavation and frequently laceration. The mass may present within the vaginal ornice or it may project beyond it depending on the size of the herma, which is often much larger than the average cystocele or rectocele. If the contents of the size include a portion of small or large intestine manual reduction is

often accompanied by a gurgling sound or sensation produced by the gas and liquid in the intestines and the mass may be rendered tympanitic to percussion by the gas in the included bowel. While any or all of these characteristics may be lacking there is one constant and typical sign of posterior vaginal hernia which is disclosed on rectal exami nation When the hernia is in the vigini the finger introduced into the rectum will readily demonstrate that the bulging of the rectum into the vagina no matter how marked con stitutes only a small portion of the mass Anterior vaginal hernia may be distinguished from cystocele by the introduction of a sound into the bladder

While displacement of the pelvic organs is not necessarily part of the picture in vaginal herma it is rather common and varying de grees of rectocele cystocele prolapse or uterine inversion may be associated with it

Complications in cases of vaginal hernia are rare Strangulation is uncommon because the neck of the sac is usually very large in proportion to its size and there is little chance for constriction to occur even in the event of pregnancy. Barker's case developed strangulation which recurred a number of times associated with symptoms of intestinal obstruction. In Case 2 in the present series there were symptoms probably due to partial strangulation which did not recur after the repair of the hermia.

Conditions which occasionally simulate vaginal herma are cysts and tumors of the vagina. They are extremely rare however and usually may be readily differentiated by careful examination. Miles has pointed out that cysts of Gurtner's duct are especially confusing because they may be reduced on pressure, the fluid returning along the duet to a cyst of the parovanium in the broad ligament.

AN ATOMICAL CONSIDERATION

The posterior type of vaginal herma is the more common occurring about sixteen times as frequently as the anterior type. In the posterior type the sac emerges from the abdomen through the cul de sac of Douglas and dissects downward between the anterior wall of the rectum and the posterior wall of

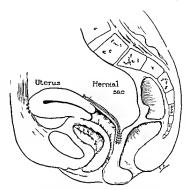


Fig 5 Completion of the combined type of operation for the repair of the posterior vaginal hernia

the vagina (Fig. 1) As the vaginal wall is pushed forward it is everted and drops down to form a soft pendulous mass which if sufficiently large protrudes from the vulva

The pelvic floor according to Thompson is a thick compact mass traversed by clefts or faults the walls of which are normally in contact but which open to allow material to pass through them Symington states that in the mesial plane the pelvic floor is as a rule about 25 centimeters thick Laterally at varies but is always thicker than in the middle near the lateral wall of the pelvis it is from 5 to 75 centimeters thick Muscles and their fascial coverings compose this floor most important of these muscles are the levator ani and coccygeus representing in the human subject two of the tail muscles of lower The part of the levator muscles arising from the posterior surface of the os pubis passes backward lateral to the urethra vagina and rectum to its insertion in the saerum and coccyy Fibers passing across hetween the urethra and vagina and the vagina and rectum constitute the pubo ure thralis and pubovaginalis respectively levator and is according to Derby one of the most variable muscles in the body. A congenital weakness or absence of these inter

communicating fibers provides the predisposing condition in the development of vaginal hernia in the event of severe strain such a strain comes during pregnancy when the tissues of the pelvis become lay and conge ted and the truma of delivery is superimposed. From a consideration of the relative strength of the pelvic floor in its median and lateral portions it will be readily seen that these hernias are likely to occur in the median line and but rively if ever on either side unless they pass through or entirely lateral to the levitor muscles as in the pudendal and perineal type of pelvic hernia.

Anterior vaginal hernias emerge from the abdomen anterior to the uterus and follow downward in the plane of cleavage between the anterior vaginal wall and the bladder

The coverings of the e hermas const tonly of the vignal mucosa and the peritoneum. The contents are in most cases portions of the small inte tine but in a few instances large intestinchasbeen found inthem. Occasionally when there has been a pelvic infection adhesions form within the sac ind about the neck in such a manner that the intestine cannot possibly pass into the herma and the contents consist of fluid only.

LTIOLOGY

Available data are insufficient for drawing definite conclusions in regard to the chology of vaganal herma. It is plausible that con central weakness of the muscles forming the pelvic floor may be an assential predispo ing factor especially when vaginal herma i found in nulliparou women. In the majority of cases however the herma i acquired and follow pregnancy or some unu unl strum or occasionally occurs with a cite or a large abdominal tumor. In these case, however it is impossible to any that there had not been congenital weakne or faulty development of the muscles of the pelvie floor which might have been the e ential predisposing factor If conjenital weaknes is not pre uppo ed to be essential it is difficult to explain why there are not more ases of vaginal hernia since the other factors namely pregnancy strain and abdominal tumor or aseites occur so commonly

TPEATMENT

lannal hernin should be treated surgically Untreated the herma tend to enlarge and the use of pallintive measures such as supports of various type has proved unsatisfactory No uniform procedure has been adopted in treatment because vaginal hernia occur so seldom and becau e co existing malpositions of the pelvic organs vary o greatly in differ ent case However certain well recognized principles governing the treatment of hernia in general must be adhered to in dealing with vaginal hernia. There are three thing that must be accomplished isolation of the sac disposal of the sac and repair of the defect at the point of egress of the hernia from the abdomen The mean by which the e ends can be the accomplished depend somewhat on the condition and position of the pelvic organs

Isolation of the sac. The ac may be most successfully isolated through a vaginal flip has been dissected free before the herma is discovered and it remains only to complete the isolation of the sac through this inci ion. It vaginal herma ha been dia no ed chinically the usual incision for the repair of a rectocele or existed depending on whether the herma is anterior or posterior. hould be made, and this sac io lated (Fig. 2).

The hernial sac may Disposit of the sa be disposed of either through the vaginal or the abdominal route Ween the operation i performed through a vaginal incision the contents of the hernia are pushed well up into th abdomen the ne k of the sac is ligated and the uperfluou portion excised It a combined type of operation 1 to be used the herma 1 reduced the ac pu hed up into the abdomen (Fig in et) and the repair of the perincum completed in the u unl manner (Fig. 3) Then when the abdomen a opened the sae 1 completely inverted and sutured to the posterior wall of the uterus or some times the exce s tis ue of the sac is excised

and the openne elo ed by a purse string suture Repair of the defect at the point of egress of the herma. If the neck of the sac is easily acce ble repair of the defect at the point of egres of the herma may occasionally be ac omplished through the vaginal inci ion

When the sac is disposed of in this manner the levatores am are drawn together and the operation completed as a high perincorrh iphy However repair of the defect in the pelvic floor is most satisfactorily carried out through an abdominal incision A erics of pur c string sutures is utilized to obliter ite the culde sac of Douglas (lig. 4) when the herminis posterior and the vesico uterine space when the herma is anterior to the uterus. In some cases the colon may be utilized to cover over the weak point in the pelvic floor. The oper ation may then be completed by the correct tion of any uterine displacement that may be present. When the patient has passed the child bearing age the uterus mix be fixed into the anterior abdomin il will (I is a)

Special eases Viginal hermis in associ ation with certain types of pelvic displace ment require special types of repair. In case of posterior viginal hernia associated with uterine prolapse of advanced degree the the patient being near or past the menopause an operation may be performed entirely by the vaginal route. A vaginal flap is dissected free as preliminary to perincorrhaphy the herned sac is isolated and disposed of as described a Mayo vaginal hysterectomy is performed the broad ligiments are sutured together well postenorly and the operation is completed as a perincorrhaphy or the vaging may be obliterated with approximating su tures of chromic citent. Two cases in this series were treated in this manner

The abdomen may be explored preliminary to the vaginal operation when abdominal complications make it desirable. The neck of the sac is closed by a series of purse string sutures and the cul de sac of Douglas is obliterited at the same time. Isolation of the sac and removal of the superfluous tissue as well as any plastic operation on the vagina mry be accomplished as a second stage either

at the time or later

When the first stage of the repair is per formed through a vaginal incision and the second stage is to be performed through an abdominal one the second stage should be carried out at the same time or before the patient is permitted to be up otherwise these hernias usually recur

SUMMIRY

Vilinal hermas are rare A surprisingly small number have been reported in the hterature and only 5 have been observed at the Mayo Chaic

The symptoms are not characteristic and it is only rarely that a diagnosis is made previous to operation. I requestly the true nature of the condition is overlooked even at operation and it may be only after the fulure of one or repeated operations that the correct diagnosis is made. Careful examinations will eliminate these errors

The etiology is not definitely known but it scens plausible that concentral weakness of the muscles which form the pelvic floor may be the predi posing factor in the production

of many if not all of the cases

The treatment is surgical and while it has not been standardized because of the varia tions in the complicating pelvic conditions the principle of an adequate procedure are well defined and correspond to those govern ing the treatment of hermas elsewhere

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PYURIA IN CHRONIC UNCOMPLICATED PROSTATITIS1

BY ALEC HORWITZ M D ROCHESTER MINNESOTA FII w S y Th My F d WILLIAM H VON LACKUM MD ROCHESTER MINNESOTA U l gy M v Cl

THE histories of 500 cases of chronic prostatitis uncomplicated by disease of the upper part of the urmary tract or by urethritis chosen at random from the files of the Mayo Clinic were studied in order to determine the incidence of pyuria The micro scopic examination of the secretion in such cases the number of pus cells in each high nower field the presence of degenerated leucocytes and their clumping ill enter into

The grading of prostatitis on the number of pus cells in each field (centrifugalized) is as follons normal r to 5 cells prostatitis graded 1 5 to 15 cells prostatis graded 2 15 to so cells prostatitis graded 3 so to 150

cells and prostatitis graded 1 150 cells or more

the diagnosis

The grading of pyuria on the number of pus cells in each high power field is as follows

pus graded 1 1 to 20 cells pus graded 2 20 to so cells pus graded 3 three fourths of high power field filled with pus cells pus graded 4 whole field packed with pus cells. In male patients urine was considered normal if there was no pus However the limits of 1 to 10 ous cells in each high power field is usually considered negligible

The cases for study were divided into four arbitrary groups (1) tho e in which clear urine (no pus cells) was present () those in which there was pus graded 1 1 to 10 cells in each field (a negligible quantity) (3) those in which pus was graded I with to to 20 cells in each field (mild pyuria) and (4) those in which pus was graded 2 or more (marked pyuria) Only cases of chronic prostatitis graded from to 4 were studied. The in

cidence of venereal disease and the relation of chronic prostatitis with and without such

BLE	1-	INC	DENCE	OF	LΖ	URIA
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Pt	Case	С	br	ct		P gr	đ đ	Pg	d d	P grd	d m
G d		c	P t	c	P	c	P	<	P .	C	P t
	6	85	53	5	3	98	6 3	7	4 4	_ 5	3
3	8		55 5	6	34	0	55 6		5 5	9	4 9
4	58	83	52 \$	55	34 8	78	49 4		6 9	4	8.8
	500	69	53 8	67	33 4	7	55 4	8	\$ 6	8	5 6

TABLE II -CASES IN WHICH THERE WAS A HISTORY OF GONORRHEA

1	c	CI	Įn į	Pgt	ð å 11	P s		P grdd		
C d	85	C se	P t	C 52	P 6	6	7 5.0	Cases 4	P 1	
4	83	3 75	7 5	58 44 54	57 4 53 57 2	5 8	6 7	1 22	3 8 2	

TABLE III -CASES IN WHICH THERE WAS NO HISTORY OF GONORRHOTA

P ostatit s	Caes	cı		Pag d I It I cells		P s gr	d d c !!	P gr ded 20 m ¢		
G de		Case	P t	Cas s	Pet	Cases	r t	С	P t	
2	75	27	36 0	46	61 3	1	т 3	1	1 3	
3	81	33	40	43	53 1	3	3 7	2	2 5	
4	3	32	4	34	45 3	6	8 0	3	4 0	
	231	92	39 S	123	53 2	10	4 3	6	2 6	

TABLE IN -RELATION OF ALMERIAL DISEASE TO CONDITION OF URINT

Post t t	1 .	Cl			Pg	ded t	11	P gr d	led t	11	P g	ded	m
C d	T tal	Cales	P	·	Til	(65	Pt	Ttl	Ca.es	P	Ttl	Cas	P
2	50	3	41	0	95	52	53 1	7	- 6	\$6	5	4	80
3	6	29	46	7	101	58	5/ 4	10	7	0	9	7	78
4	55	23	41	3	78	44	53 4	11	5	46	14	11	9

Withhis f lds as

disease to pyuria was also noted. The results of the study are shown in Tables I to IV

CONCLUSIONS

- 1 A history of gonorrhea was elicited in a little more than half of the cases of prostatits. The fact that the incidence in the three grades of prostatits (grades 2 3 and 4) was about the same would indicate that gonorrhea bears no relation to the seventy of prostatits.
- 2 In about one third of the cases the urine was clear and in about 89 per cent it was either normal or almost normal In 11 per cent there was either mild or marked pyuria

the more severe the prostatitis the more severe the pyuria

- 3 In about r5 per cent of the cases in which gonorrhom was associated there was either mild or marked pyuria
- 4 In the cases of mild pyurn the more severe the prostatus the less frequent the modence of gonorrhoca (86 per cent in cases graded 2 and 46 per cent in cases graded 4). The number of cases however is too few in
 - this group to warrant definite conclusions 5 In the cases of marked pyuria gonor rhoca was present in approximately 80 per cent regardless of the severity of the prostatitis

INFECTIVE OSTEOMYELITIS

BY POBERT KENNON AND LIKE BY DE LIVE BY OF LINES Leet 1 gyU vfL n 1

TNFLCTIVL osteomy elitis may be defined as a septicamia which metastasizes in The term schoolbox s disease hone is metaphorically descriptive of the usual age and sex of the victim Commonly an ob cure history of all health colds body topsillates pneumonia or general rheumitic pains will precede the mild prun which localizes the disease in the end of a long bone and since few schoolboys especially among the poorer clas es willingly forego their games for a simple cold certain school authoritie have found it advisable and provident to insure against the disastrous consequence sequely of this disease a history of trauma is however frequently ab ent and ostcomychtiin association with simple fracture is a rarity

Our professional objective in dealing with acute o teomy elitis is to avoid by means of early diagnosis and prompt urgical treat ment prolonged suffering and ultimate phys ical deformity. Generally even in neglicited cases life can be saved but it must be borne in mind that in fulminating cases septicumia will cause death however careful the operator may be to e tablish free drainage turther with py emic cases, the danger of pericarditis

must not be overlooked

The primary object of the present paper is to define the early diagnostic signs of osteo myehti By the ud of these the development of a focus can be su ce sfully checked by immediate surgical interference and thereby much suffering can be averted

THE IRIMAKA OSSFOUS FOCUS OF OSTFOMAELITI5

Acute osteomy clitis starts in the shaft of a long bone in an area ometimes termed the metaphysis immediately beneath the epi physeal cartilage. It occurs but rarely in the epiphysis proper so that the term epiphy sitis is a misnomer for the acute dis as and in my opinion the term should likewi e be used only with great re erve in tubercu lo is The primary focus of osteomy elitis is almost without exception within the can cellous bone from which position it spreads with variable rapidity and extent to the bone marrow and to the periosteum finally the infection may involve by exten ion the intra mu cular planes subcutaneous tissue continuous joints. Since the di ease always begin in the center of a bone the use of the term perio titi in this condition should be di continued it conveys nothing but an entirely erroneou idea of the disease and

suggest inadequate treatment

The carlie t characteri tic smptom of icute ostcomy clitis i pain and tenderne's on pressure with one fineer over the end of a long bone -briefly de crib thle a one tinger rheumatism of bone this pain is severe in character it render becoming the and its onset I as ociated with high temperature frequently preceded by a rigor. These few physical signs are certainly dia nostic of the onset of o teomy eliti and if operative procedure tollows promptly the rayage chronic bone di exe will he averted in all moderate infection. At the early stage of the injection negative radiological findings are the rule and there is no doubt that \ ray examination of cale of acute osteomy chitis within the first 48 hour is often a waste of valuable time and con equently a danger to the sufferer's himb and life

It must be emphasized that swelling 1 a lite symptom it appears only after days when the central abscess has tracked through the vascular channels to the perios teum and has formed the subperiosteal pock et This fact is of importance for differential dragnosi since it will be recalled that the onsets of pun tenderne's and swelling are synchronous in icute rheumati m

So frequently are the symptoms of this disease misinterpreted during its early stage and false hopes ruled by a negative radio logical report that I feel it is of importance to describe accurately the most con tant po ition of one finger pain and tenderne s with respect to each of the long, bones in order that chinerins may subject the e-politions to digital pressure in all dubious eases of rhei matism. Probably none of the following observations is essentially original many of them are confirmations of opinions by a urious teachers and writers on this subject but to far as I amaware they have not hitherto been recorded systematically. Ample proof that these points of maximal tenderic are of reasonable constancy have been obtained also from the examination of muscum specimens and of roentgenograms of chronic ere

VINIMAL POINTS OF TENDERNESS IN LARIN

CNSES OF ACUTE OSTEOMALITIES LIFE
FARRINITY (LIGS 1 AND 2)

r The interointernal aspect of the neck of the humerus

The posterior surface of the lower end of the humerus above the epiphyseal line

- 3 The posterior surface of the upper end of the ulna
- 4 The anterior surface of the lower end of the radius above the epiphyscal line

LOWIT EXTREMITY (FICS 5 1VD 6)

- I The antero internal aspect of the neck of the femur
- 2 The posterior aspect of the lower end of the femur above the epiphyscal line 3 The antero internal aspect of the upper
- 3 The antero internal aspect of the upp end of the tibia below the epiphyscal line
- 4 The posterior aspect of the lower end of the tibin above the epiphysenl line

The last is the most common situation for ostcomyelitis in the whole body and in view of the liability of the ankle to trauma during school life memorization of this site and recollection of the etiology and symptoms will obviate many mistakes and disasters

DIAGNOSTIC VALUE OF RADIOLOGICAL EXAMI NATION IN EARLY OSTEOMAELITIS

It has already been indicated that in the majority of cases of acute osteomy clitis during the first week radiological examination is a waste of valuable time and may prejudice the patient's life. There is however no doubt that if at the end of 48 hours the case has developed a small local swelling associated

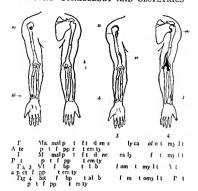
with pain and tenderness over the end of the bone the ratiologist—by examining the immute details of prints of the limb taken from different positions—will be able to demonstrate by the slight roughening of the osseous surface the exact position in which the central aboves make its exit such in formation is clearly of decided value to the operator. If on the other hand marked rathological change in the bone are evident within the first 45 hours after the discovery of the symptoms, the case is more probably one of tuberculous o tomy litts.

Radiological examination ifford more conclusive evidence when the case has been neallected or overlooked because sufficient time will then have elipsed for descrictivation of the bone to be perceptible and of course if the case is of the chrome type the radiologists report is invaluable. The history of the case will serve to differentiate instances of decalerication of bone due to humorrhagic effusions—as in a crushed foot without frue ture or infection—or due to passive edema of a limb from an injury e.g. a junshot wound

These general statements are illustrated by the following cases

Case a Robina J 12 verts of age collided with a telegraph boy wheeling a bicycle and limped home 7 days later she was seen at a hospital and her case was diagnosed as rheumatism accurate cross examination of the mother would have revealed two important facts (1) that the onsets of the pain and swelling were not synchron ous and (2) that the swelling when first noticed was over the end of the bone namely on the posterior surface of the tibia behind the internal malleolus and was not at the time a general swelling of the whole ankle joint. On the fourteenth day after the accident the operation took place from the usual situation on the posterior surface of the lower end of the tibin I evacuated half an ounce of pus from a small subperiosteal abscess and from the center of the bone. To the casual observer the radiogram (Lig 10) was negative even at the end of 14 days but the slight hintus in the outline of the compact bone (Fig roa) corresponds exactly in position to the opening through which the central abscess burst beneath the periosteum. This girl in spite of the delayed treatment made an excellent recovery and a very later Dr R L. Poberts reported that with out the lustory he would not have known from the roentgenogram that the tibia had ever been diseased

Cisr Dorothy J aged 13 years had no his tory of trauma but had suffered for a days from



ute pain and tender so in the lower end of the femur. Her timperatue on adm. n. w. sog de reis. F. One fing r. tendern's war prosing the control of the fine the poly and in entire poly cale space. Figure r. shows the roentgenogram. h. ch. is extreve Ope ation disclosed a limit prost um but fliud dram of pus within the b.n. Complete healing resulted n. 6. eeks.

It is unnecessary to quote or illustrate further cases in order to prove and emphasize the necessity for operative measures advocated solely upon the clinical evidence even when the radiological picture discloses nothing abnormal

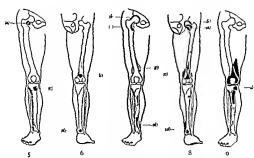
POSITION AND EXTENSION OF THE SUBPERIOSTEAL ABSCESSES

Let us now consider an average case in which some swelling is present. This swell in may be due merely to ordema of the periosteum but much more commonly actual pus is found to be present at the time of the operation. It must be emphasized again that osteomy elitic commences in the bone and therefore the term periostitis conveys a false puthological impression of the disease. The central absense in the bone probably finds its way to the surface of the bone through the vascular foramina and upon the number of

these depends the ituation of tenderne's and subsequent swelling. The sites of the swell ings which appear about 48 hours after the onset of acute infective osteomyelitis and their method of extension in the upper cytremity are illustrated by Figure 3 and 4

The subperiosteal abscess at the upper end of the humerus spreads equally in an anterior and posterior dire tion (Ligs a and 4a) around the inner side of the humerus and therefore lifts the important vessels inward away from the bone Early operation upon such a case will show in many instance that the inflammation has not extended into the joint But unfortunately the capsule of the ioint extends downward to be inserted into the perio teum of the humerus and there ore joint involvement at this situation doe occur early and commonly (Figs 3b and 4b) General cedema of the arm re ultime from an acute infection at the upper end of the bumerus is often maximal over the lover por tion of the arm if this fact is recollected surgical exploration at the wrong end of the bone will be avoided

At the lower end of the humerus the subperiosteal absects usually spread upward and laterally (Fig 4c) more to the inner than



I ig 5 Maximal points of ten l m s in early cases of ostcomyeliti aspect of lower extremity

11 6 Maximal points of tenderness in early cases of ostcomyelitis 1 o terior

aspect of lower extrem ty

10 7 Sites of subperiosteal abscesses from 0 teomyelitis Anterior aspect of lower extremity
10 18 8 Sites of sul periosteal abscesses from 0 teomyelitis
10 Po terior aspect of

Ing 8 Sites of sul periosteal abscesses from 6 teomyclitis 10 terior aspect 6 los er extremity

Fig. 9 Sites of subperiosteal absce ses from focus at the upper end of the tibia

to the outer side and gradually extends an teriorly (Fig 3e) Involvement of the elbow joint by direct extension is common because unfortunately the bone in this region is very thin and because a tongue of diaphysis extends downwards to take part in the formation of the trochlear surface which separates the center of ossification of the internal condyle from the rest of the cpiphysis

The subperiosteal abscess from the upper end of the ulna points backward and must be distinguished from olecranon bursits a mild degree of which is also a natural concomitant of osteomyclitis in this position Joint involvement is rare except in neglected cases

At the lower end of the radius the sub periosteal abscess (Figs 3d ind 4d) extends upwards and outwards beneath the extensor tendons of the thumb and may point on either side of these. Tenosynovitis of these muscles is usually present but this must not divert the attention from the recognition of the causal lesion in the bone.

The situations and modes of extension of the subperiosteal abscesses in the lower limb are illustrated by Figures 7 8 and 9 From the neck of the femur a small abseess (Figs 71 and 81) collects round the neck and at an early period although not invariably it will burst into the hip joint (Figs 7b and 8b). This common and disastrous sequel is surely one which may more often be prevented.

When the central absecs at the lower end of the femur emerge it lifts the loose perios teum between the supracondylar ridges and then extends upward and laterally chiefly on the inner side (Fig. 8c) and thus gains the anterior surface of the femur (Fig. 7c). In volvement of the knee joint is uncommon because of the relations of the capsule posteriorly and the presence of a subsynovial membrane anteriorly in advanced cases but in fulfiniating cise extension into the joint may occur together with separation of the epiphysis

I rom the upper end of the thin a central infection will spread downward along the subcutaneous anterior surface of the bone (Fig 9a) but because of the cloe proximity of the capsule of the knee joint to the septic focus joint involvement is a very common although avoidable complication (Fig 9b)

From the lower end of the tibra, the ab cess spreads inward and upward on to the anterior subcutaneous surface (Fig 8d and 7d) Marked cedema around the malleoli is a prominent feature the in early cases is an effect of gravity and exploration will not reveal any pus at this stage-indeed in eisions below the malleoli are indicative of erroneous location they are necessary only to open subcutaneous abscesses in neclected The ankle joint usually develops a serous synovitis but suppurative arthritis there is extremely uncommon osteomyelitis of the fibula is easily recognized and localized because the bone is subcutaneous

The neute subperiosteal ab cess bears no relation in size to the central abscess indeed Nature may have forestalled the surgeon so far as to leave the patient with a healing central le ion although an extensive sub periosteal absce s is present. In such ca e no pus under tension will be found on drill ing the hone in fact if the patient tem perature is low and the aperture connecting the subperiosterl abscess with the central cavity is large drilling may be unnece sary met as a tooth need not always be removed when an abseess is pointing in the neck or on the face Before leaving the subject of the subperiosteal abscess it may not be out of place to point out that bare bone is not necessarily dead bone and that extensive sequestra involving for example one third of the bone are rare these can be produced only through failure of the periosteum to burst subcutaneously so that a tension is erested high enough to induce thrombosis of the nutrient arterie or through injudicious and rough investigation of the ab cess cavity at the time of the operation leading to rup ture of these vessel Obviously the nutrient vessels to bone are of great importance and all operators should consequently be familiar with their situations

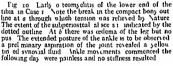
POSITION AND FATENSION OF SUBCUTANFOUS AND INTRAMUSCULAR ABSCESSES

The subcutaneous and intramuscular ab scesses and their sub equent sinuses re ult in late cases from the bursting of the sub periosted absces. They may point at either border of a covering muscle or may be directed way from the primary le ton by the ease of spread along vessels or by the influence of gravity. The portions at which they are commonly found will now be indicated.

Upper extremity The subcutaneous ab seess from ostcomyclitis at the upper end of the humerus points on either ade but more often at the anterior side of the deltoi I muscle near its insertion, this is in contrast to di case of the clavide which leave sinuses near the origin of this muscle. The abscess from the lower and of the humerus points usually just above the internal condule less commonly it may appear above the external condule that derived from the upper end of the ulna reache the surface either directly over the olecranon or under the influence of gravity lower down on the posterior surface of the forearm and the ab ce from the lower end of the radius may point on either ide of the extensor tenden of the thumb

Louer extremity. An ib ce derived from the upper end of the femur may point in three different positions (1) on either side of the adductor lon-us tendon with extension from gravitation a in pages abscess down the inner side of the thigh () on either side of the sartorius and (3) at the lower border of the cluteus maximus toward which it has been directed by the internal circumflex artery and by gravity when the patient ha been commed to bed I rom the lower end of the femur the abscess points usually on the inner side of the thigh and much higher than may be expected if the patient be in bed with the knee flexed which posture induce the pu to burrow amon, the po terior Occa ionally in ambulatory case the pus may de eend through the popliteal space deep to the call muscles and reach even to the tendo achilli. An abice's aring from the upper end of the tibra is visible directly over the anterior surface of the bone but if the knee joint is involved the exit i variously situated around the anterior aspect of the joint more commonly toward the inner side of the thigh The abscc s from the lower end of the tibia either points directly over the subperiosterl absce s on the anterior





surface of the tibra or influenced by gravity often travels deep to the internal annular ligament and points on the inner aspect of the foot

SITES OF MAXIMAL DISEASC AS ILLUSTRATED BY MUSEUM SPECIMENS

The pathological changes resulting from chrome infective osteomy elits of acute origin a eapparent in the photographs taken from specimens kindly lent by Prof E E Glynn In Figure 12 there is a large cloaca posteriorly in the metaphysis of the lower end of the femur but the joint cartilage is comparatively healthy Figure 13 evhibits in the posterior aspect of the bone an involucrum or bridge of new bone formed from the raised periosteum in this case the epiphysis and joint are healthy. In Figure 14 there is a large se questrum on the posterior surface of the

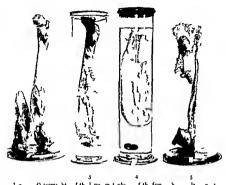


14. 11 I arly o teomy clins of the lover end of the femur in Case Radiological evilence was negative

femur the rest of the bone is healthy but it is so definitely thickened that in pre radio logical days the les was amputated on the assumption that the condition was sarcoma tous (Brodie's abscess) the joint is healthy

These specimens may serve to confirm the statements that the septic focus originate in the metaphysis that at the lower end of the femur it is the posterior surface which is almost invariably affected and that involvement of the joint need not necessarily follow even in needected cases

Three photographs are reproduced of chronic osteomy elitis of the upper end of the tibrith, are all probably of tuberculous onigin. In Figures 16 and 17 the lesions are driphyseal and the joints are healthy the carious sequestrum in the latter figure is apparent. Figure 18 depicts a cold above 5 in bone with a 'py ogenic membrane situated in the driphysis and extending posteriorly and subperiosteally into the knee joint. These figures demonstrate that the initial focus of osteomyelitis at the upper end of the tibba is on the anterior surface of the bone.



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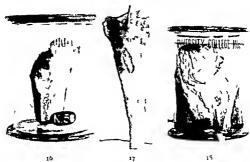
and is diaphyseal in origin. The significance of these specimens in the cluddation of the starting points of tuberculous osteomyelitis and arthritis will be discussed later.

TREATMENT OF ACUTE INFECTIVE

Most surgeons will him their technique to drilling the bone in the earhest stage and will rouge only when a well formed central abscess is pre ent. Within the first 3 weeks sub-prenosteal resection should never be per formed Cases are exhibited from time to time of reconstructive operations to replace a portion or the whole of the shaft their uccess depend on performance at a late period of the infection when radiological evidence can be obtained that new bone is being laud down by the periosteum. Partial diaphis sections is not an operation to be lightly undertaken in cases received at the

onset of the disease. The final re ult in a patient who survived this operation is illustrated in Figure 75 the deranged are of the knee and ankle joints should be noted and the ligamentous tissue which once joined the ends of the bone.

In pproaching the le ion in the bone it is advantageous to modify the incision so that the surface of the bone may be drilled or gouged in the most desirable position surface of the lower end of the tibia or femur or the posterior surface of the lower end of the tibia or femur or the posterior surface of the radius and every endeavor should be made to e tablish drill holes on those surfaces where as has already been described the critical abscess most commonly reaches the surface Again when opening the subpenosteal abscess due regard must be paid to the nutrient artery since if thi be damaged one third or one half of the bone may be lost. Damage to the nutrient



 $\Gamma_{\rm b_n}$ 16 . Chronic o teomyelitis (tuberculous) in diaphyseal portion of the upper end of the tibia

Fig. 17. Chronic osteomyclitis (tuberculous?) in diaphyseal portion of the upper end of the til ia showing carious seque trum

Fig. 18 Cold ab ce 3 (tub reulou) with progenic memi rine in the diaphyseal portion of the tibia, the infection traveled posteriorly and subperitonically into the knee joint.

vessel is usually the result of late surgery but occasionally it may be due to bad surgery just as osteomyelius of the patella can be produced by a careless operator through the muching of the patella when a suppurating pre patellar bursa is being opened or excised

Free drainage is the keynote of success and frequent probing of the sinus must be avoided All secondary operations for the removal of sequestra should be well spaced in regard to time and we should remember that normally it takes about 6 weeks for a sequestrum to separate \ ray examinations are of extreme value but less so than the intermittent bursts of pus as an indication of the presence of dead bone which even in large bulk is occasionally indetectable in a roentgenogram

JOINT INVOLVEMENT FOLLOWING OSTEOMYELITIS

If the early diagnostic signs are regarded and if the operation is undertaken without delay this complication should occur much less frequently than it does. It arises of course most commonly in those joints in which the cripsule extends on to the meta physis. The knee from the upper end of the tibia the hip from the femur the shoulder

from the humerus and the elbow from the humerus are all very commonly—or almost constantly—not led and this need not be the case provided early treatment is accomplished. The involvement of the joint is far too often the result of a rupture into the joint of the subperiosteal collection of pus which could easily have been exacuated from below and extra articularly if the condition had been recognized in time

TUBERCULOUS OSTEOMYELITIS AND APTHRITIS

The method of joint involvement just stated affords an explanation of why those in charge of surgical tuberculosis not infrequently obtain entirely successful results in cases diagnosed as tuberculous arthritis. Thus the perfect joint movements which follow treatment eg of a hip exhibiting muscular spasm and cold abscess formation force one to the conclusion that the primary tuberculous focus on sprending to the periosteum has failed to extend into the joint and that the case has remained throughout one of ostetits and not of arthritis

A series of roentgenograms which Dr T H Martin medical officer in charge of the Leasowe Cottage Hospital for Surgical Tuber culo i bis kindly lent me contridiets the assumption and illu tration of C ilot! that tuberculosi commence beneath the articular cartilage. The initial ki ion he about the spiphisseal cartilage i frequently on the draphy cal side a macute infective o ten mix little. The inpunion bit if o been i middle from my mill clinical experience of idult cases and it is upported by pithole ical evidence (1), if t., [15].

I word of warning I bain nece its upon the in inniherace of neutive ribiological reports a pecially in adult, although in contra t to icute infective o te michti letinite radiological evidence is pre ent in th more acute forms at tuber als a within as hour of the onset of pun etc cie fre quently occur where i cold ib co farke ize precele by minth definite ratio located evidence in the pine hip etc. So fre quently are carly case of tubercul a dianosed as hy terical and di credit thereby brought upon our profe ton that he would uree practitioner to receive their diagnor of ob cure joint complaint until a racint cino grams taken at 3 monthly interval have fuled to reveil a tocu - unle of cour c

cold above starmation remove the doubt—and to treat such each proviously a tuberculor payme particular attention to the toximal by which they are a unlik

accompanied

Accompanied
It hould be noted in the connection that
the eccurrence of in evene cent welling, over
the end of a boin often intelled to depected
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direction in licited for cities infective of teo
mychit thus it resumple term i focus at
the lower end of the tibric the rib ecc. may
noint forward.

Because of the caregition of urgical tuberculor acreal urgeons have fewer opportunitie for studying uch eve but

1 1 1 4 11 1 1 1 1 1

they cannot ful to appreciate the good realts obtained by conservative rather than operative measures

It howe or ridologically more disphyseal toon are being demonstrated than the textbooks would sugge t—there is surely in the to it on that from time to time those accument to home surgery will be tempted to explore the early le ion on tho earne occars when it is encountered rather than let nature take its course. When the latter method is followed joint molycament my cruse—is course which remind one of the lay or perityphilit when the appendicular form with increasing the many contractions.

SUMMARY

r The foci of route osteomychits are in the driphy c of long bones their positions and line of extension to the periodeum are ilmost my include and are indicated for each long bone.

Miximal tenderne's on deep pressure over the os cous focu is pre ent and i of di i, in the importance in early stage prior to the development of the subperiosteal ab ces which usually form on the disphyses near the coupling of the couplin

I configure from in early case may be viluele and milerding only those which are taken tangentially to the position at which the abpenose alabaces usually form that to how evidence of early dieae.

4 Surpeal procedure by the route in hated hould be directed to the points of maximal tenderne without delay in order to charite extension to the ionis.

nite in o cou form and to extend imilarly for extremely early cic operative measures at the hand of experts appear logical

THE SURGICAL IMPORTANCE OF A RAY LAMINATION OF THE TRACES AND THE BRONCHS

BAPEGITS OR A JISTISBERG AND AN ASTRIA DEBT TO THE COLOR OF THE COLOR

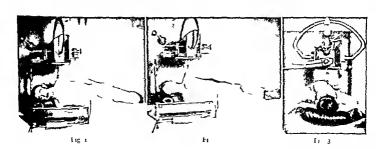
IT is vell known that the tracher is easy to examine by means of roentgen rays and the reason for this is that it is a hollow calinder filled with air which is embedded in organs (I greater density. The result is that the wind pipe absorbs much less of the rays than the vicinity thu making its differentiation easier. But we must not only be able to create an \ ray picture of the tracher we must allo recognize change in its form and position. As long as we had eximined the tracher only with a samital direction of the rays our knowledge of such changes remained our cumscribed for a plate or a fluoro copic examina tion under sagittal irradiation can reveal only lateral displacements or corresponding compresion of the wind pipe but will never disclose a dorsoventral displacement or a corresponding narrowing of the tracheal lumen. A picture of the latter changes can be eucred only through lateral irradiation of the trachea (7)

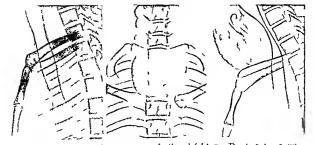
The patient lies on one side at an angle of oo degrees to the table (Figs. 1). The shoulders are bent maximally backward the times are pulled backward and the hand are clasped. In this position with the humeral epiphyses directly over each other the patient is fiviled with the girdle of the Bucky Potter driphrigm the knees drawn up (this makes the position more stable)

The patient's head is fivated at a natural height by mounts of andbags and one should see that it is neither extremely stretched or bent forward

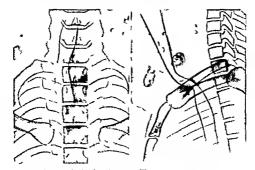
The plate should be about 18 by 4 e numeters or 4 by o centimeters (large format). The long side of the plate should be parallel to the long axis of the patient's body. The central ray should full upon the mid-point of the clavice farthest from the plate the protection of the ray findly falling on the center of the plate. I dienfeld's technique for lateral photography of sternum is similar.

ligure a demonstrates a normal tracher in lateral projection. In contrast with plate taken with pittent in anteroposterior position which would show the thoracic portion of the wind pipe very unclearly at the best we see the whole traches with the cervical and thoracic sections as far down as the bifurcation The lateral picture is per se better than the dorsoventral picture because it does away with the disturbing vertebral shadows thus making the picture clearer and allo because it is possible to reveal the whole length of the wind pipe. The picture in literal projection makes it cast to recognize any changes or displacements of the trachea in a dorso anterior direction or inv flattening of the tub in the same dire tion

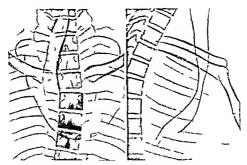




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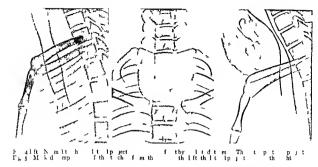
I is 6 Retrotracheal calculad struma. The anteroposterior projection is on the left the lateral projection is on the right



Retrosternal struma The anteroposterior projection is on the left the lateral projection is on the noht

compression of the trachea and will hardly be come conscious of any disturbance. It is true that such patients are always in danger since even a moderate swelling of the mucous mem brane as a result of a tracheal catarrh may lead to most severe dyspnæa and suffocation. It is therefore necessary that an \ ray examination of the trachea of gotter patients be done even though the patient does not complain of dyspnæa It is not at all necessary that the extent of the changes in form or position be commensurate with the size of the goiter and these changes are

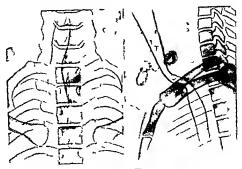
often small in large tumors and can be found quite great in small ones. Accurate knowledge of the condition of the trachea is a prerequisite for operation of the thyroid The surgeon must be well oriented on the changes in form or position of the trachea before he operates he must know especially from which side the pressure of the thyroid tumor acts upon the wind pipe and to what degree this pressure has stenosed the tra chea often a large thyroid lobe causes little or no symptoms of compression while a small node may provoke the severest symptoms of stenosis



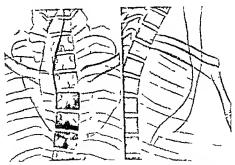
If we add the sanittal examination of the trachea to the method of lateral projection we achieve even greater orientation as to changes in form and polition. In addition to the \ ray picture which is of great importance fluoro conv is allo of e pecial value in the examination of the trachea because it permits u not only to examine the wind pipe in the two chief meridians of space but it all o permits us in turmin the patient about to examine the treachea in an infinite number of meridians although not as clearly as with a picture. This c mbined meth. I not infrequently affords us complementary ma ternal as to the character of the tracheal om pression Granted that there is good light a y and pape with a regularly wide lumen will appear equally wille all alon its course at every point in of the nationt and its contour will be very definite since the tracheal diameter (and thus also the thicknes of the column of air in the trachea hich is cut ly the central ray) must be the same in every projected direction lecause of th practically cylindrical shape of the tube Fluoroscopic examination of a trachea the lumen hich varies at different points as due for example to gotter compres ion is quite lifferent If we supp) e that the pressure of the goster occurs on the left an I right si les and reduces the ize of the lumen equally from all side to about half the size then the thickne of the column of arr which is cut by the central ray all be different in different positions of the patient. The nar rowed portions f the wind pipe will become sharper in the fluoroscopic picture in that ray

meridian in which the central ray passes the greate it diameter of the trachea that is in the ca e-mentioned in a soutiful direction and in compre sions in an oblique direction when the patient is placed in a suitably oblique position. It is inherent in the nature if the X-ray examina to in that it should permit of an easier and more accurate differentiation of displacements and compressions of the truchea than lary nological methols hereas other questions pertuining for example to the condition of the mucous membranes innervating disturbances, etc. are solved only by the latter method.

Changes in the form and position of the trachea are most frequent in cases of goiter. It is in these cases that an objective determination of the condition of the trachea 1 of the utmost im portance since a is well known dy procea in a gotter patt int is not nece sarily caused by tracheal compression Lut may be due to disea e of other organs mo t frequently that of the heart or the lungs (ve must emphasize the close connections between goster and the heart) The operative removal of the goster in a patient in hom the dyspnæa has falsely been considered as due to a compression of the wind pipe by the struma would do the patient no good but would expose him to no little danger becau e of the reduced resistance of the heart or the lungs. We must also bear in mind the frequent and surpri ing in congruence between the extent of the tracheal stenosis and the degree of dyspnœa Thus pa tients whose goiters grow slowly will be able to accustom themselves to the gradual and regular



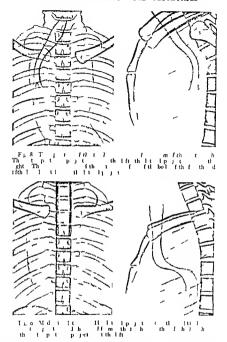
It 6 Retrotracheal calcut ed struma. The anteroposterior projection is en the left the lateral pr jection is on the ri ht



Retrosternal struma The anteroposterior projection is on the left the lateral projection is on the noht

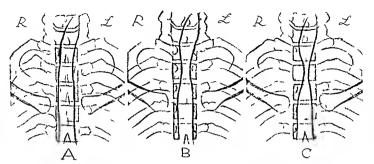
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The p > sh lines $f \setminus r_1$ examinatin of the trichea are not exhausted by the letermination of changes in f rm and position with this method rather than with any other the islas of etter all e to determine whether or not there is a r + to sternal $tr_1 = 0$ pre ent. Precisely such knowledge regarding intrathoracie gotter—whether the latter be as usual simply a continuation of the gotter of the ne k or whether the tumor is an isolated one in the breast cavity—seems to us to be of

great my rtune frim little welling fan intrath facie ection of a ginter as a result of inflammation or hemorrhage may cuse lunger ou pressure on the truthea especially as the gid wild by the latter priclude the equal of tribution of such pre- ure in other directions if ignorant of the presence of such a condition emay remove the tumor but the cau eof the stenoists the retrosternal struma is left. In the determination of the presence of a retrosternal

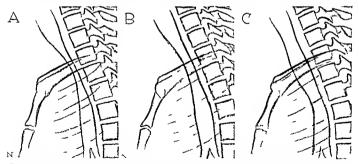


I g to Tracheomalaets f the right tracheal wall \ \all al as test (increase in intratracheal pressure). There is a considerable increase in the width of the tracheal stenoise e pecully due to a protrusion of the right wall. \[\text{Attention projection of a trachea compresse! } \]

to the form of a aber sheath 15 pr. sur on the right and left from \(^1\) gotter (normal intratracheal pre ure). C. Mueller test (decrease in intratracheal pressure). Con iteral le narros in \(^1\) of the trachea especially due to the further depression of the right will.

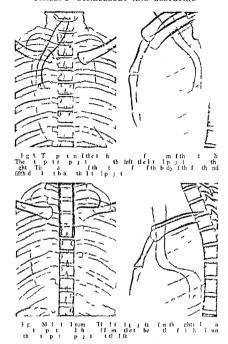
strum: fluoroscopy plays a great role simultane ously affording us important information on the condition of the heart and lungs. In addition to the size and position of the tumor \alpha ray examination permits us to gain information on the degree of its displacement when the patient coughs and swallows. Since the goater is attached

to the wind pipe it must be lifted on coughing or swillowing unless it is more solidly attriched to the neighboring structures. The X-ray determination of whether or not the goiter is sufficiently lifted under these circumstances is one of the important criteria for the kind of treatment (operative or conservative). If the displacement



| Ti | Malacia in the region of the anterior trachest wall | V | Mueller's test (reduction of intratrachest pressure) | Consideral le nurrowing of the traches as a result of the further depression of the anterior ir cheal wall | B | Lateral projection of a trach a compressed from

the front by a go ter (normal intratracheal pressure C Vd ahas test (increase in intratracheal pressure) Con side able widening of the trachea due to distention of the anterior tracheal wall



The pessibilities if \(\bar{\chi}\) rive examination if the truchea are not exhau t d by the determination of chain es in form and position with this method rather then with any other in is also better all to determine whether or not there is a reto sternal stance peep end in the recisely such knowle geogradian intrathoraci gotter—i hether the latter be as usual simply a continuation of the gotter of the neck or whether the tumor is an isolated one in the breat tearthy—eems to us to be of

great importance for a modicate swelling of infrathoracic section i a goiter as a result infirmmation in hemorrhage may cau e dan er ous pressure on the trachea especially as the rigit wall of the latter preclude the equalistribution of such pressure in other directions. If ignorant of the presence of such a condition was remove the tumor but the cau e of the stends is the retrosternal struma is left. In the termination of the presence of a retro termination of the presence of a retro termination.

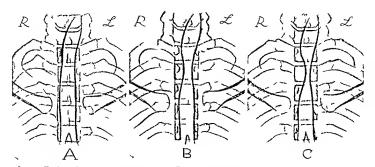


Fig. 10 Tracheomalacia of the right tracheal will A vil alwas test (increa e in intratriched) pressure). Thereis a considerable increase in the width of the tracheal stenosis especially due to a protrusion of the right will B Interoposterior projection of a trachea compress ed

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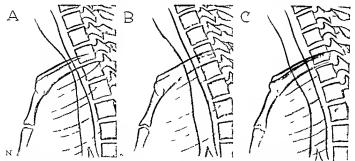


Fig. 11 Malacia in the region of the anterior tracheal wall. A Mueller's test (reduction of intratracheal pressure) Considerable narrowing of the trachea as a result of the further depression of the unterior tracheal wall. B Lateral projection of a trachea compressed from

the front by a goiter (normal intratracheal pressure C Valsalva's test (increase in intratracheal pressure) Con siderable widening of the trachea due to distention of the anterior tracheal wall

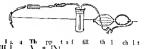


is but moderate then we must consiler that adhe ions are present which vould make operation difficult. An attempt to dislodge an intrathoracic gotter which has been fastened to the neighborin organs may easily leal to the ropture of thin ens and thu all o to air embolus or asphavia. The length of operation can enhance the in culence of a mediastinal emply ema provoke injuries to the pleural apex damage to the nervus recurrens etc.

We present one pictures which illustrate the value of X ray examination f the traches from both the sagittal and lateral aspects. Figure 5 shows in the anter-posterior picture on the left 4 dense shalor in front of the wind pipe. This is seen to be a calcine 1 strumar in the lateral year.



Fg 3 Shw th ty telhet pt



shown on the right. But there is still another reason why the trachea was hardly visible in the anteroposterior view The trachea has been so flattened in the sagittal direction that the \ rays pass through a very narrow layer of air in the tube thus creating a hardly visible picture Figure 6 illustrates the changes which affect the trachea as a result of a calcufied retrotracheal struma. As is shown in the lateral view on the right the trachea has been pushed forward and compressed from behind. In the anteroposterior picture on the left the trachea is hardly recogniz able because of the frontal flattening A marked compression of the wind pipe as a result of the action of a retrosternal goiter is illustrated in

action of

Displacement and compression of the trachea are found not only in cases of goiter or glandular tumors of the neck but as the examination of the tracher in pictures of two perpendicular prosections vill sho such changes are also found in intramediastinal diseases especially mediastinal tumors an laneurisms of mediastinal vessels but al o not infrequently in divers di cases of the lungs (contractive processes tumors etc.) and the pleura (effusions accumulation of air and tu mors) The condition of the trachea can among other symptoms often be a differentially diag nostic factor hetween aortic aneurism and mediastinal tumor (6) Whereas an aneurism especially one of the aortic arch will displace the tracher in a lateral direction such a change of position with the presence of a mediastinal tumor takes place in a dorsoventral direction (with the exception of intrathoracic goiter) A marked compression of the trachea as is so often found in \rax examination of mediastinal tumors is seldom found in cases of aneuri m. The type of trached displacement further affords us a means of diagnosing the source of the aneurism (ascend ing or descending agree the arch) Corresponding to the topographic relationships aneurisms of the ascending aorta will displace the trachea fre quently toward the left and backward whereas aneurisms of the arch corresponding to their proximity to the left wall of the trachea will dis place the latter toward the right Aneurisms of the descending branch finally vill push the

tracher toward the front or the right of they are still within the region of the tracher altogether. The most intimate relationships with the tracher are to be found in cases of anguirism of the arch.

If in the case of an unilaterally contracting pulmonary tuberculosis the trachea is not only pulled to one side but also advanced toward the anterior or posterior wall of the thora; the clinical methods of examining by percussion and auscultation may lead to the mistaken diagnosis of cavities. The marked transposition suffered by the trachea in cases of ancurism of the arch are illustrated by Figure 8. Figure 9 shows a twofold bend in the trachea in the lateral view on the right. This picture is from a case of medias timal tumor, and the anteroposterior picture on the left gives no idea of the severe changes which the trachea has suffered. These are to be seen only in the lateral view on the right.

\ ray examination of the changes in form and position affecting the trachea the diagnosis of an intrathoracic goiter the determination of the condition of the heart lungs and resophagus do not entirely complete the possibilities of this method We are also able by means of \ ray examination to form an opinion on the resistan e of the tra heal ca tilage an important cons deration in determining further procedure. It is precisely this knowledge which should not be underestimated in considering the amount of danger to the patient which results from the pressure of the gotter on the wind pipe. The solidity of the car tilage may be reduced by the pressure of an old gotter the cartilaginous support may disappear in part and the ominous picture of trackcomalacia may appear and threaten the life of the patient With X ray examination this condition can be



Γig 16 Position of the patient for fill no the right lower lobe in bronchography



II, 15 The latient hold he laryn, eal catheter he tween his teeth ready for till no the bronchial tree while I chind the X ray apparatus

recognized and is an absolute indication for operation even though the cartilaginous structure of the tracher is itself not visible weakening of the cartilaginous support of the wind pipe may be deduced from the way in which the lumen of the tracker is widened or narrowed by increase or decrease in intrathoracic pressure It will not be difficult to conclude that malacial changes of the cartilage are present in the region of a tracheal stenosis if the width of the tracheal lumen increases markedly upon increase of intrathoracic pressure or if the former is definitely reduced upon reduction of the latter The increase in pressure is provoked by Valsalva s test (expiration with the external air passages closed) a decrease by Muellers test (inspiration with the external air passages closed) These remarkable oscillations in the width of the tracheal lumen during these tests are easily explained by the reduction in resistance of the tracheal wall at the points of malacial transforma tion With increase in pressure this transforma tion leads to an abnormal protrusion of the wall as soon as the intratracheal pressure is reduced



Fig. 17 Postion of the patient for filling the right upper lobe in broncho_raph;



F 8 B n h g plv \ m l! h li fih

there is neces arily a marke I der ressi in at the same point. On the other hand, the changes in shape of the trachea in cases with unaffected cartilaginous rings are relatively light they are at least equal on both sik a neintra whereas the malacial changes are u ually al normally marked eccentric because the affects a usually seizes but one side if the tracker wall. We are thus able to make a fun ti nal examinati n f the cartilagin us supp rt f the tricheal wall t test its reaction t incre ise and lecrea c of intra tracheal pressure and t gain important information on its relistance. Il wever it will be too much to have the examining physician explain both the Val alva and the Mueller tests t every gotter rationt during \ riv committee n f the trachea. This y ull be esteerally impossible in the case of the mass material factionic. It is quite sufficient in inicial purp is to substitute simple c uphing f r the Vil alva test and smiff n_m (Hit enlerge) f r the reduction of intratracheal res ur Bfr the patient earnes ut the e measures h mut le slads turned into thei ition I chin I the tlur | peilit in which the tricher i m 1 vi ible ie the p siti n in hi h the central riv jas e thr ugh the greatest

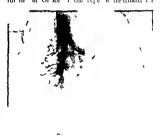
dimeter filt in held ten si.

There is nut ally a gri buil trinsiti nin many en es from mirkel malacra to mally en situted carillag not rings and the cases in his structured carillag not rings and the cases in his carrying legree freducel resistance are marked by correspondingly large or smalles wissons up on changes of pressure. In such cases it it of est genal value to make a picture in or let to compared fine testices of the form of the tracket under

normal and varied pressure conditions (Valsalva

An excellent case of tracheomalacia is illus trated in Figure 10. The tracheal stenosis is seen in the middle with the breathing normal ie under normal air pressure (there is a saber sheath compression) The picture on the left shows the condition of the tracher when the pres ure is increased (Valsalya test), and the one on the right when the air pressure is reduced (Mueller's test) There is a very great difference in the wilth of the luming between the picture 1 and C The mulacia primarily affects the right wall f the tra hea \(\fraction \text{re n l case of tracheo}\) malacia buch vas estecially recent alle in the lateral vie a illustrated in Ligure 11. The center ricture B ships the lateral view of the trachea ith normal lifeathing ie normal pressure con litt no. The trachea is pushed in from the fr nt The picture n the left shows the conlitton of the vand pape when pressure is reduced (Mueller's test) and C sh we the tracher under increase lair pressure (Valsalva). The changes in the size of the lumen are remarkably great the Yeav examinati n suggests a diagno is of trache malacia of the anterior wall of the win I pipe (cervical section). In this care as well as in the force and one and in many others, the operation corrol orate I the rountgen il gical in lings

The systematic teeting of the resistance of the tracheal cartilizes to changes in a ressure during X ray examination is likely to become very help ful in air chaine of the type of treatment for



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goter patients. It need not be especially emphasized that a diagnosis of marked malaca is an absolute indication for operation. In the presence of even a slight reduction in the resistance of the cartilagnous support of the tracher operation would seem advisable unless severe dieless of the heart of lungs were present.

A ray examination of the effect of pressure changes on the tracheal wall will doubtless be of especial value for therapeutic indicationsoperative or conservative treatment-in those complicated cases in which a large portion of the tumor reaches down into the mediastinum and compresses the thoracic section of the tracher and in which the thyroid tumor is seen to be hard ly movable i.e. attached to its vicinity upon coughing and swallowing behind the fluoroscopic plate. In such cases it is very difficult to decide upon treatment particularly if marked cardiac lesions are present. A diagnosis of a weakening in the tracheal cartilages in the thoracic section will make it more advisable to operate despite the dangers of operation than to treat the patient expectantly granted of course that the internal findings have also been taken into conside ation

BRONCHI

In this paper we wish to consider only the method of broncoghriphy which has been de veloped in recent years the method of introducing a substance an iodized oil iodipin (Yerck) or lipiodol into the bronchial tree which throws a shadow and thus makes the \times ray examination of even the finest branches of the bronchial possible. The method of contrast fillings of the bronchial tree was first suggested by an American Tackson



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and by Lynah It was only a few years later however that the method experienced a remark able advance through the work of Sicard I orestier and Leroux. These authors all mentioned differ ent methods of introducing the contrasting jodized oil but all these methods have the common char acteristic that the \ ray examination of the lungs is carried out only after the rodi ed oil has been introduced into the bron hi The introduction of the contrast mass is thus done without the enid an e of the roentgenologist. This not infrequently leads to a lack of filling in precisely those bronchi which are of diagnostic interest. To obviate this difficulty Hashinger who carned out such examinations with Lenk constructed a bronchial sound which after the lary ny and the trachea have been anæsthetized can be introduced into any desired bronchus and the contrast media injected this method will hardly become generally used since it demands a rather high degree of special ization and also puts a greater burden on the patient than is desirable especially if the patient is tuberculous. Beck and Sgalitzer have developed a method at the Vienna Ear and Surgical Clinics (r and) which is simple which does not demand too much assistance on the part of the patient and which also possesses the advantage of introducing the iodized oil directly into the bronchial tree under the control of the \ ray The entrance of the iodized oil into the bronchial liranches is observed on the fluoroscopic plate so that this becomes analogous to the fluoroscopic examination of the stomach

The method consists in first anæsthetizing the Iarynx and then introducing a soft catheter which



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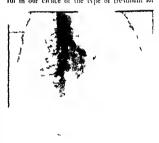
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There similarly i or i built ansition in many cases from mikel militer to normally ensituted earlinging errors and the cases with varying dege fre luce I resistance are marked by corre per hingly large er simil excursions upon changes of frecure. In such cases it is of especial value to make a picture in order to compare definite stage. If the form of the tracked under

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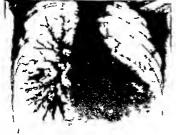
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DROVCHI

In this paper we wish to consider only the method of broncoghraphy which has been de veloped in recent years the method of introducing a substance an iodized oil iodipin (Merik) or lipiodol into the bronchial tree which throws a shadow and thus makes the X-ray examination of even the tinest branches of the bronchial tree was first suggested by an American Jackson



I 1 20 Broncho raphy Cylindrical bronchierta es

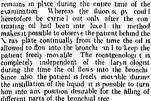


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and by Lynah. It was only a few years later however that the method experienced a remark able advance through the work of Sic and I orestien and Lerous. These authors all mentioned differ ent methods of introducing the contristing iodized oil but all these methods have the common char acteristic that the I ray eximination of the lungs is carried out only after the todi ed oil has been introduced into the bron hi The introduction of the contrast mass is thus don authorit the guid an e of the roentgenologist. This not infrequently leads to a lack of filling in precisely those bronchi which are of diagnostic interest. To obviate this difficulty Hashinger who carried out such cy aminations with Lank constructed a bronchial sound which after the larvax and the trachea have been anasthetized can be introduced into any desired bronchus and the contrast media injected This method will hardly become generally used since it demands a rather high degree of special wation and also puts a greater burden on the patient than is desirable especially if the patient Beck and Sgalitzer have de is tuberculous veloped a method at the Vienna Ear and Surgical Clinics (r and 2) which is simple which does not demand too much assistance on the part of the patient and which also possesses the advantage of introducing the iodized oil directly into the bronchial tree under the control of the \ rai The entrance of the iodized oil into the bronchial branches is observed on the fluoroscopic plate so that this becomes analogous to the fluoroscopic examination of the stomach

The method consists in first anasthetizing the larynx and then introducing a soft catheter which





It is not possible to observe certain parts of the lungs for example the bronchial tree of the upper lobe or of the lo er lobe by means of a suitable transposition of the patient during this method of examination

In all our examination e male use of the notize I oil marketed by the firm of Merck under the name of rodipin. It is a 40 per cent oil which gave us excellent contrast shadows and was well tolerate! by the patients. We ob erved symptoms of iodism in mly a fev case and in but a mo lerate degree since the splitting off of iodine from the oil proceeds very slowly. The examination of the urine reveals the presence of but small quantities of iodine. For the prophylaxis of the patient is who perhaps swallow small quantities the lodge I oil it is well to make a practice of a Iministering a purgative after the introduction of the oil

Even in cases in which ve u ed large quantities of about 20 to 30 gram of iodipin (15 cubi centimeters are usually sufficient) we never observed any mentionable dyspines and in cases treated



with smaller quantities of about 15 cubic centimeters there was never any dyspnæa at all

Sometimes there is a slight rife in temperature following the in tillation of the iodized oil which lasts for about a day. The method developed by us permit us to vork satisfactorily with relatively small dises of the iodized oil since ve constantly control the contrast littling with the eye.

The apparatus u ed by us (Figs 1 13 14 and rs) consists of a semi oft catheter with a diameter of 2 millimeters. A fine silver wire is attache I to this catheter, the latter being placed under the glottis after the larynx has first been anasthetized. The silver wire hold, the supple catheter in place in the larvngeal curviture de stred and also permits of a constant control and ob cryation of the position of the latter The portion of the catheter in the mouth is attached to a hard rubber cup held in the teeth so that the position of the catheter remains constant through out the entire procedure of filling. The catheter is further connected with a small Junker appt ratus by mean of a rubber tube the flow of the todized oil being controlled by opening or cloing a clamp attached to the connecting tube. The other tube of the Junker apparatus 1 attached to a regular double bulb which permits easy regula tion of the pres ure of the flow of the iodipin

Mer the laryn has been anæsthetized with a to per cent solution of occinie the catheter controlled by the larvingeal mirror 1 introduced under the glottus and the patient is told to grasp the rubber cap in hi teeth. The small Junker apparatus is filled with todipin and the patient 1 then ready to be fluoroscoped.



Fig. 4 Broncho, raphy in thoracoplastic There is a bronchial fistula her

The patient is thus freely movable and the reentgenologist can place him in any position desirable for the filling of any portion of the bronchial tree. Pressure on the hulb forces the thodipin through the catheter into the trachea and thus into the bronchial. It is thus possible to observe where the oil flows from the very beginning. As soon as that part of the bronchial tree which is diagnostically important has been filled the clamp on the connecting tube is closed the in stillation thus stopped and the catheter taken out of the larynx. To prevent coughing with certainty we also always anyesthetize the trachea by means of a cocaine adrenalin spray in addition to the pharynx and larynx.

An even more simple technique which was ilso developed at the I Surgical University Clime in Vienna and used repeatedly there is the method of suallowing the wrong way (Verschlucken) (3) This method is also advantageous in that it permits of simultaneous \ ray observation as in the method mentioned above. The method is based on an observation of Nathers who in injecting contrast media in the asophagus of a patient with an ocsophageal carcinoma simul taneously but unintentionally also injected the bronchial tree with the barium mixture. The pa tient who was anæsthetized had simply swal lowed the whole mixture down the trachea (he later coughed the mixture up and had no complaints) This and other observations show that a patient whose larynx and pharynx are an



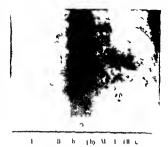
11 5 Bronchiecta e in one of the upper l bes

rathetized often swillows the wrong way as is not unknown to lity ngologists. Whith had hap pened unintentionally it that time was then later used by us as a method for filling the bronchial tree.

We first have the patient clean his teeth and mouth by brushing and gargling repeatedly. Then the phirtyn' hypopharvn' and laryngeal entrance are thoroughly anæsthetized with a rot to 5 pir cent occaine solution. As soon as anesthesia is complete the patient is allowed to drink the contrast oil behind the fluoroscopic plate in repeated small portions. If the anæsthesia has



Fig 6 Br nchowraphy Bronchiectases in one of the apper lobes



ben really complete the great may rity of patients will swall withe oil lown the trachea and the flowing in of the oil as yell as the direction of its course by any desirable point in of the patient can be observed behind the later.

Now an lagain the method is all wing fails especially in patients with an infantile form of the eniglettis. The method should not be u ed in the presence of acute or chronic infections of the buccal or pharyngeal cavities (for example tonsillitis sinus diseas enipharyngitis and ozena) The e restriction do not of course hold good for the metho i with the lirengeal catheter for the intro luction of the catheter is independent of the form of the epi_lottis and the fluid used drops directly into the trachea and thus ayor is any infectious material contained in the naso pharyngeal cavity. We have ne or observed any damages as a result of this swallowing methol We nevertheless now use the method with the catheter ilm si exclusively since it is not only practicable in all cases but also possesses the advantage that the jodized oil introduced does not come in contact with the mucous membrane of the mouth

It is easy t ee the advantages of filling the bronchial tr e with contrast medri under the control of the eye by means of V ray examination. Nost important of all ve are tible by means of this methol it measure the quantity of the oil introduce l and to interrupt the further flo of oil as soon a e hive satisfactorily answered the diagnostic results with relitively small does of sodized oil. The possibility of controlling the flow of the cil into the bronchial tree all o enable us to differ its course to a great extent. If for



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example large quantities of the oil collect in the wind pipe we can immediately interrupt the further introduction of oil until the contrast fluid has again begun to drip slowly into the bronchial tree. This precludes the possibility of many complaints on the part of the patient—dispince and coughing. It is also possible to direct the flow of the ult into certain do ured parts of the bronchial tree by means of the suitable tran position of the pratter.

The simplest portion of the lung to fill is the love labe. Tipping the body of the sitting patient at an angle of 30 or 45 degrees towards the de well side will lead to the proper effect (f): 16)

The introduction of iodized oil into the upper lobes of the lum, is more difficult. Whereas we formerly did this type of filling, with the patient is side po iton and perhaps with the pelus raised behind the \(\chi_1\) ray will we later abandoned this method and began to use the \(\chi_2\) ray table becau e the necessary displacements of the Crookes tube box of the irradiating wall the work at the irrs displaying in in short the \(\chi_2\) hole business of controlling the flow of oil into the bronchial tree under \(\chi_2\) rays \(\chi_2\) as its permitted by the position of the patient on a simple examining table before the \(\chi_2\) ray gla \(\simes\) we now carry out such fillings only on the \(\chi_2\) ray table the patient being turned on one side at an angle of about \(\chi_2\).

degrees by means of pillows (Fig. 17) In addition to this lateral turning it will usually also be necessary to create some elevation of the pelvis by placing some flat pillows under the patient's buttocks One should pay especial attention to the fact that the patient's head must not be the lowest point of the body The head should be raised somewhat by means of a pillow or a roll in order to keep the entering oil from collecting in the wind pipe and thus provoking coughing. If with this method the iodized fluid enters only the larger bronchi of the upper lobe in question it will be well to increase the elevation of the pelvis as soon as the filling has been completed and simultaneously to tell the patient to breathe deeply a few times. One then observes that the

sometimes even fills the apical portions of the lung
It will not be difficult to fill the right middle
lobe if the patient is placed horizontally on the
table and turned about 30 degrees on the right

contrast fluid enters the finer bronchi also and

It is at any rate important to keep the lungs under \(^{-}\) ray observation during the entire period of iodized oil treatment since there are no absolutely binding rules for filling certuin pirts of the lung and since the position of the patient is body must frequently be corrected according to the momentary condition of the bronchal filling. Thus it will often become necessary to increase the pelvic elevation in filling the upper lobe when the observer sees that the oil is not flowing entirely or in great part into that lobe or the side position of the patient's body will have to be increased in fillings of the lower lobe whenever the \(^{-}\) ray observation reveals that a part of the oil is entering the chief bronchus of the other lung

The most important prerequisite for the in troduction of iodized oil into certain definite portions of the bronchial tree is as complete an anæsthesia as possible which precludes any cough ing during the filling Observations on patients with bronchial fistulæ in whom the contrasting agent was introduced without the use of cocaine anæsthesia have shown (5) that the small branches of the bronchi and the alveolar tissues tolerate the presence of bismuth without reac tion Coughing begins only when the column of bismuth has reached the hilus region 1e the bronchi of the first and second order A violent coughing reaction is then provoked at the bifur cation and in the trachea. On the basis of this observation it becomes apparent that not only the larynx and pharynx but also the trachea should be an esthetized by means of a cocaine spray The degree of sensitivity varies greatly from patient to patient. Whereas some patients are completely unresthetized by slight quantities of cocaine and the introduction of the iodized oil then goes forward without any reaction there are other patients in whom the choking and coughing reflexes are difficult to remove and can sometimes be stopped only after the use of an alcoholic solution of cocaine and a morphine injection. It is better to leave the lung unfilled than to do it under insufficient anasthesia since the desired effect will not be achieved under improper cir cumstances The patient continues to be restless will not remain in the position necessary for the filling in question and also coughs most of the oil back out A small quantity of the oil is pressed by the patient into the small bronchial branches and even into the alveolar tissue whenever the patient is able to keep the coughing back (this is then equal to an unintentional Valsalva test) but this usually concerns a portion of the lungs which is not at all in question. We thus lay great weight on as complete an anæsthesia of the pharyny laryny and the tracheal mucous membrane as possible and believe that this is the circumstance which reveals alveolar fillings so seldom nowadays

which reveals alveolar fillings so seidom nowadays. We have never observed any harm resulting from an alveolar filling on the contrary we achieved an especially favorable therapeutic effect by such a filling in a patient with a very old chronic bronchitis and a very thick secretion. We nevertheless try to avoid such a filling as an un desirable of effect. The iodipin or lipiodol which reaches the alveoles remains there and can some times be seen hardly diminished in quantity after several months. The resorption in the alveoles is unusually slow.

arveoles is unusually slow

In acute catarrhal conditions in which a satisfactory anasthesia is very difficult to attrun we will with the tracheobronchial filling until the acute symptoms have subsided regardless of

the basic disease in question

Whatever contrast oil is in the smaller and larger bronch is usually excreted rapidly. In addition to the coughing and the action of the chated epithelium the active effect of the period the smooth musculature of the tracheobronchial wall is also of importance as Reinberg (I c) was able to show. At any rate, the rapidity of the excretion of the oil depends also upon the rigidity of the thorax wall, the elasticity of the lungs etc. Although the small and large bronch ind themselves of their contents rapidly there often remain roentgenologically noticeable quantities of the material in the smallest branches as a wall precipitate. Such residual material can

often be seen after 24 hours and sometimes even after 2 or 3 days. The small residue which is normally found in bronchi with a macroscopically normal structure even a few days after introduc tion is always to be found in pathological con ditions of the bronchi such as bronchiectasis and decomposing foci in the lungs. Such residue remains for a more or less protracted period of time and can always be seen to ntgenologically The residual oil and also the fine precipitates which we can find only by chemical means are the sources of a possible therabeuts eff t especially masmuch as the jodized oil comes into closer contact with the walls of the bronch after the other contents have been previously coughed up during the process of cocaine anæsthesia. As a matter of fact we have observed a favorable therapeutic effect in a number of cases by the introduction of indized oil into the bronchial tree in cases with small bronchiectases and bronchitis with thick secretion. In the case of large bronchiectases filled with out in which the indized oil cannot come into contact with the wall of the cav ity nothing is to be expected. The attempts to introduce medicaments into the bronchial tree are old but the method developed ly us for in troducing such medicaments under the control of rays is the first attempt to exclude accidents in such medication and to apply the a ent with great certainty to the point of disea e In order how ever to achieve such ends the medicament must be of such a nature that it becomes viable under I rays or else the agent must be mixed with some substance which thro s a shadow Such basic substances which throw a shadow under \ rays are the 40 per cent iodipin (Merck) and lipiodol which are both as mentioned above combina tions of jodine with the higher fatty acid. These substances are also important because of their iodine content (We recall the important role of iodine medi ation in pulmonary tuberculosis) As already mentioned this close combination between the jodine and the fatty acids permits of only a very slow splitting off of jodine so that the danger of 1) lism is to be considered only for nationts with an indine idiosynerasy preparations also cau e no unpleasant symptoms from the gastro intestinal tract. They are both oils substances hich are espe jally suitable for use in the bronchial tree and have a consi tency which is very similar to that of the bronchial mucus a circumstance which seems to us to be of especial advantage These oils are well tolerated by the bron hial mucous membranes On the su gestion of Pal (4) we have repeatedly in troduced a mixture of equal parts of iodipin (40

per cent) and agoleum into the bronchial tree in cases of bronchicctasis and chronic bronchine Agoleum is a silver preparation which was in troduced by Pleschner for the treatment of the bladder The density of the shadow despite this dilution was nevertheless so good that the 40 per cent iodipin alone hardly gave a better pu ture although agoleum alone is hardly noticeable

in the \ ray picture of the lung In respect to the quantity of iodized oil to be used for therapeutic purposes we can say that we never use more than 10 to 20 cubic centimeters for the bronchial tree As soon as the medicament has passed a bronchus of the second order 1e as soon as it has reached a pulmonary lobe it enters the different branches of the bronchi of this lobe alternately. This is due to the fact that the distribution of the filling in any section of the bronchial tree is subject to a constant change With every more or less forceful expiration when ever the throat is cleared or as a result of the ac tion of the bronchus peristalsis some of the jodized oil is forced from the smaller to the larger bronchi in order then to flow back into other smaller bronchi at the next inspiration viscous character of iodipin explains why small quantities of the oil always stick to the bronchial wall and thus have some therapeutic effe t

We make a practice of filling but one lobe or at least but one side at one sitting. We leave an internal of at least 5 or 8 days between bronchial fillings. As already mentioned there is a slight rise in temperature after the bronchial filling in some patients. In cases we observed a rapid rise to over 38 degrees C but the temperature dropped in both cases to normal within 4 hours. Such rises in temperature seem to occur especially in patients with tuberculous proces es in whom we no lon er carry out the filling. Usually, however no disturbance results from the fillin and the patients often feel much better because coughing becomes so much easier.

Bronchal filling with jodine oil is not dan erous if quantities no greater than the ones mentioned are used. Aside from one transient cocaine in toucation which is not the fault of the method itself we have never seen any damages despite a great number of cases thus handled. However we do not consider the method to be fool proof. A filling should be curried out only if there is a possibility of a real dan nostic or therapeutic gain. It is natural that we should not only take the condition of the lungs into consideration before mixing a filling (we believe that an exudstite form of pulmonary tuberculosis is a contra indication to the filling) but we should also pay attention to

the general condition of the patient. Thus for example patients with severe cardine or nortic changes or very nervous patients should not be treated.

Finally we wish to present pictures which illustrate the importance of bronchography

(Figs 18 to 8)

Figure 18 shows a normal bronchiral tree of the right lower lobe. Figure 19 illustrates the bronchial tree of a retracted lung in the ease of an empyematous crvity. This case presented the question as to whether there was a decomposition focus in the shrunken lung. The result of the bronchography answered the question in the negative. Figure 20 illustrates immense cylin drical bronchiectases Figure 23 very extensive cyst like ones and Figure 23 very extensive cyst like ones and Figure 21 smaller bronchiectatic sacks.

Figure 24 tllustrates a thoracoplastic because of tuberculosis Bronchography shows that there is

a bronchial fistula present

That the filling of the bronchial tree of the upper lobe is possible with the right technique is shown by Figures 25 and 6. In both cases bronchiectases are noticeable in the upper lobes

Figure 27 illustrates an alveolar filling. As we have already mentioned such an alveolar filling is not desirable although we have never yet seen any detrimental results. The resorption of the iodized oil from the alveoles is very slow and hardly noticeable. Such an alveolar filling is enhanced and is made liable to occur if an esthesia of the alveoles is incomplete.

Figure 28 illustrates a bronchai carcinoma The left bronchus is distended like an Indian club and then follows an apparently complete block. The bronchus is manifestly substituted by the tumor The iodized oil collects in the bronchial tree of the healthy lung despite the fact that the patient was turned at an angle of 45 degrees toward the affected side and was finally laid on the

diseased side altogether

The introduction of jodipin into the bronchial tree is undoubtedly a great help in the rudiological diagnosis of pulmonary affections. Bronchog raphy is especially valuable in the diagnosis of bronchiectasis because of the difficulties in clinical diagnosis and localization of this disease and in the \text{\text{Tay}} examination without a contrasting agent. Bronchography can also be of great importance in the diagnosis of doubtful tuberculous cavities foci of destruction in the course of gangiene, abscesses and their resultant cystis and bronchial carcinoma. We cannot fail to mention that the possibility for studying the way in which the bronchial tree branches under

normal and pathological conditions the nature of its excretion under coughing in healthy and diseased lungs open new vistas to research

SUMMARY

In the \ray examination of the tracher of gotter patients the lateral view is also of im portance in addition to the frontal one. It is only by means of the double examination in two major spatral directions that we are able to gain definite information on changes in the form and position of the wind pipe Fluoroscopy is also of great im portance since it enables us to see a malacia of the cartilaginous rings-a strict indication for opera tion because of the danger of death-in addition to affording us information as to the presence of any possible intrathoracic goiter or changes in the heart or lungs Malacial changes in the cartilages but also slight reduction in the resist ance of these eartilages are to be diagnosed by means of the marked dilatation of the trachea upon increase in intratracheal pressure (Valsalva s test) or an abnormal narrowing when the pressure is reduced (Mueller's test) The degree of differ ence in the size of the lumen depends upon the degree of malacia of the cartilages To simplify the examination of such conditions of the wind pipe it is sufficient simply to have the patient eough behind the fluoroscopic plate to increase pressure or to sniff in reducing intratracheal pressure Great difficulties in deciding whether operative or conservative therapy should be followed especially in cases complicated by serious heart lesions will often be removed by means of such a test of the resistance of the eartilaginous support of the trachea

A method of introducing a contrasting oily fluid into the bronchial tree by means of a catheter for bronchography is reported. The method possesses the advantage over former methods of permitting of constant rocht, enologic observation of the treatment from the very beginning. The method also prevents the iodized oil from coming in contact with the buccal mucous membranes. The patient can be brought into any desired position and the direction of the flow of oil in the bronchial tree so controlled as to fill any desired part of the lungs (including the upper lobes) at will Only one side should be filled at one sitting it possible only one lobe.

The most important factor which is necessary for successful bronchography is complete anaesthisia of the pharynx larynx and the tracheal mucous membrane (the latter by means of acocaine spray) Although the method is harmless with good technique it should be used only with a definite

indication in mind especially for the dia_nosrs of bronchiectases New possibilities for the introduction of medicaments which throw shadows are also discussed

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LARSEN-JOHANSSON S DISCASE OF THE PATELLA

BY GFORGI W HIWLEY MD FICS A ARTHUR S GRISWOLD MD B IDGES T CONF TICUT

HE precise diagnosis of lesions about the knee joint has of late reached a degree of considerable executude be cause of the increasing interest in the so called internal derangements of the knee. Thus it was a matter of unusual interest to the authors to come upon an apparently unknown patho logical entity.

(ASE REPORTS

JF a boy 12 years of ag pr sent d hims if on opt 1 6 227 th the c mplaint of om in tent pain and a limp following a mild strain of the left kines sustained dur g a football g me the pr yous autumn He h d not been ser oush, deashled but h d noticed a c rtain amount of d comfort of the errors.

Fi months late the patent r turn d complaining of recurr nee of pain this time in both knees after plas g football and riding a bicycle E ammation then show d some swell g and tendences o er both p t lia at thir low r borders especially the left and there app ared to be a me actual bony alarg ment at this point. Ro nigenograms sho te the patellis to be pear shaped with well mark d knob on the lowe poles where fusion f the separation at the number of the separation of the separation of the separation of the separation of tween the to centers of ossistence separation is tween the to centers of ossistence and the separation of tween the separation of tween the separation of tween the separation of tween the separation of the sep

It may be of interest to mention the fact that this boy was the son of a famous football coach and that his first cousin had had bi lateral Schlatter's disease a year previously

As no case with similar clinical or roent geological features had ever come to our attention a search of the literature was there fore undertaken in an attempt to determine whether or not any similar lesion had been hitherto described. Nothing was found in either the English or German literature which seemed to have a bearing upon the subject but articles by two Scandinavians were discovered in which each author independently described precisely the same condition

In 1921 Dr Sinding Larsen (14) recorded as a new clinical entity the case histories and



Fig. Ca e. 1. Roentgen) ram trum allust atim the appearance of both Lness in April 1927. The left thee (with ymptoms) shows an accessory center of cossification at the lower pole of the patielly also the beak slaped tibul epiphysis with framentation (symptomiess) present in O cood Schlatters die ca e. Then in theme (symptomiess) shows e on more clearly the separate center of cossification in the patella. Here the tubul epiphys is normal in shape

roentgenograms of two otherwise healthy girls aged to and it years respectively who after overstraining themselves by dancing and jumping had complained of pain in their knees When the patients were seen by the author the affection was in each case clinically umlateral the lower pole of the affected patella was painful on pressure and in one of the eases the soft parts over and below the patella were slightly swollen. In the roent genograms of the knees taken in profile the anterior and lower outlines of the painful patelle were hazy with abnormal calcium deposits or bone shadows in the periosteum helow the patellar apices The author inter prets these findings as indicating epiphysitis caused by overstrain and offers in support of his conclusions the findings of a mild Schlat ter's disease of the tibial apophysis (without symptoms) in one of the cases. The roent genograms of the healthy knee in both cases showed similar abnormalities in a lesser de gree The first case was treated by immobili zation in plaster for 6 weeks the second with rest without fixation. In each case a complete recovery both clinically and roentgeno logically resulted after 6 months of treat ment

In 192 Dr Sven Johansson (8) unaware of Larsen's paper reported the same con



lig. Ca e i I contgenorrum trucings of the same here as shown in Igure 1 7 months litter. The left knee hows lusion of the accessors center of o sifection in the pritell which is now well advanced. The beak hape I tibal epophs is has also partly fured with the display. The right knee show is the process in given of the eparate center of o sifection but at a less rapid rate than in the left knee.

dition as in apparently unknown lesion of the patella. Four cases were recorded by him as follows

I girl aged r years complained of the gradual onset of pain in both knees For months the pain had been worse after gymnastic exercises Examination showed tenderness and some swelling over the lower poles of both patelly especially the right. The roentgenograms showed a separate irregular center of ossification at the lower pole of each patella more clearly defined on the right The side also showed the roentgenographic pictures of a typical Schlatter's disease of the tibial tuberosity although chinically symptomless. On the left where the patellar changes were less marked the tibial apophysis was normal in appearance. Treatment by rest and support resulted in a complete recovery in 3 months Roentgenograms at this time showed the apices of the patellize to be somewhat plumper than normal but there was complete fusion of the separate centers of ossification

CASES 2 and 3 Two bots uged 13 and 12 years respectively developed knee prin after vague in juries incurred several months previously. In Case 3 the characteristic roentgenographic changes of Schlatters disease were present upon the affected side although no clinical symptoms were present CASES 4 A gril area of a period to begin had been for

CASF 4 A girl aged 13 years had pain for years but it was confined to one knee

Each of these patients made a prompt and complete recovery after the knee had been relieved from strain for a month or two

From a consideration of these 6 cases and the r which we have reported several points of interest appear worthy of mention. In the

first place the age distribution is restricted to the period of most active growth that is from 10 to 14 years and the symptoms an parently develop only in children who lead an especially active life Second in eases with unilateral symptoms roentgeno grams of the apparently normal knee in each case showed identically the same changes but to a lesser degree Third it seems of some significance that in 4 of the cases the typical roentgenographic changes in the tibial apo physis present in O good Schlatter's disease should exist without symptoms. I ourth the I ray changes of these lesions involving the upper and lower points of attachment

of the patellar ligament are very similar According to Adams and Leonard (1) the patella is not infrequently subject to anom alies in development. O silication commences at the age of 5 or 6 year and the development is usually from one center. However con genital anomalies with two or more centers of ossification are more common than generally supposed and are frequently mutaken for fracture. Such anomalies are usually bilateral and eventually the various centers u ually fuse more or less completely to form one bone The usual site of such an accessory center of ossification is at the outer margin of the patella as first pointed out by Kempson (9) In some instances instead of fusing with the main bone, the ossification persists as a separate center and thus has been fre quently mistaken for vertical fracture of the patella as pointed out by various authors from time to time. In 1020 McVally () in a study of a large series of patella obtained from cadavers found that a per cent had a more or less marked defect at the upper outer margin of the patella with or without a true accessory center of ossification at this site He found that such defects of a safication were bilateral in two thirds and unilateral in one third of the case Of special interest in the large number of anomalous patellæ which he describe is one with a definite partially fused separate center of ossification at the attachment of the patellar ligament to its lower pole. So far as could be ascertained no earlier mention of a center of ossification at this site had been made in the literature

Many theories as to the ethology of Schlat ter's disease have been advanced by various investigators since it was first described in 1903. One group consider it to be a purely local non traumatic lesson and describe it variously as apophy sitis tibialis adolescentum (Alsberg in 1908) osteochondritis secondary to prepatellar bursitis (Kienboeck in 1910) (puphy sitis tibialis dessicans (Ebbinghaus in 1913). Irregular periosteal growth (Peter in 1913) and infectious periostitis (Graf in

A second group consider Schlatter's disease only as a part of a generalized affection of the bones and joints. This is termed a general disturbance of ossification (Lanz in 1903) late rickets (Jakobstal in 1907) a deformity from disturbances of growth (Bergmann in 1900) and a systemic disease characterized by periosteral separation and general ligamentous weakness (Schulze in 1013).

The purely traumatic theory of etiolo y was advanced by Altschiel in 1018 but few are willing to subscribe to this theory 10 o Mueller after a thorough and impartial review of the whole question advanced the reasonable hypothesis that trauma per se was not the original cause but only acted on a pre existing weak spot due to local or generalized irregulanty in growth. In support of his con tention he reported a case of bilateral Schlat ter's disease with marked roentgenological findings (though mild clinical symptoms) which showed similar changes in the le ser trochanters more pronounced on the right than the left and also in the lower pole of one patella in which there was irregularity of out hne and periosteal elevation entirely without chinical symptoms From this he concluded that Schlatters disea e was a local mani festation of a systemic process characterized by a tendency to pathological epiphyseal injury brought about by the strain of at tached ligaments and tendons without note worths traumatism. If he is correct in his assumption it would seem logical to conclude that Larsen Johansson's disea e is another such local manifestation which develops at the site of an occasional anomalous epiphysis in the patella. It is interesting to note that Lewin (16) in a recent discussion of apophy

sitis of the os calcis states that he believes that this constitutes another lesion of a similar rature involving an epiphysis which serves as an attachment for a large tendon

CONCLUSIONS

In the authors opinion a clear parallelism exists between Larsen's and Schlatter's disease. In each instance there is anomalous bone formation-in the latter the beak shaped tibial epiphysis in the former the ac cessory center of ossification at the apex of the patella Therefore it is natural to believe that a potential mechanical weakness crists at the lower end of the ligamentum patella in the one case at the upper end in the other We believe that the two lesions are not usually associated with sudden trauma but are the result of continued strain on the patellar ligament which not infrequently occurs during such vigorous exercises or games as horseback riding football jumping etc Furthermore the clinical signs and symptoms roentgen find ings course prognosis and treatment are so similar that the analogy appears complete

The authors believe that the two diseases are essentially triumatic resulting from a strain of the patellar ligament which is in it self potentially strong but in both Osgood Schlatter's and Larsen Johansson's disease is attached below or above into a weak point of anchorage

The diagnosis is based essentially upon the finding of a definite circumscribed point of tenderness over the lower tip of the patella and the detection by roentgenological examination of a separate center of ossification at this site. This case emphasizes the value of giving due recognition to the common physical sign of a shriply defined point of localized tenderness, and the necessity for careful in vestigation for the cause of the tenderness.

The late Dr Lewis A Stimson for many years emphasized the importance of the sign of local tenderness in diagnosis pointing out that this physical test was the most valuable one in detecting a fracture sometimes the only sign present and the test which most accurately defined the site of the fracture. He was an acknowledged genius in localizing in juries of the bones by physical examination.

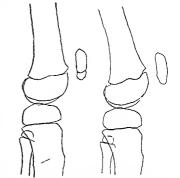


Fig. 3 Case 2 Roentgenogram tracings of both knees December 1927. In the left knee the patella shows a well marked anomalous center of ossification at the lower pole. There is also an impacted fracture through the bad of the tibia. The patelly of the right knee is normal.

In the authors opinion the meticulous ex amination for the detection of localized ten derness has been productive of bringing to light many lesions which were previously poorly understood such as epicondy litis of the elbow strain of the rhomboid muscles at their at tachment to the scapula fractures of the bones of the carpus and tarsus sprun of the pluteal muscles and similar lesions. We be heve that it is not illogical to suppose that beneath a sharply defined point of local tenderness over muscles ligaments or bones there exists a definite injury to one of these structures (in the absence of any infectious process or disease) especially with the history of trauma indulgence in active forms of sport or an occupation where unusual strain is ex erted on a certain part of the body point of view and the habit of attempting ac curately to localize points of tenderness per haps sometimes overdone were responsible in this instance for the detection of the lesion

ADDITIONAL CASE REPORTS

More recently another case of this iffection was discovered in a boy who sustained a greenstick fracture of the upper end of the tibia with almost no

He ha I stepped in a bole an I fallen subjecting his knee to a sullen severe strain. He continued to walk for s yeral days but ith a co s derable 1 mp which did not improve. He then consulted the family physician who found a line of cleavage at the lower pol of the patella as det r mined by a roentgenogram (lig 3) and made the diagnosis of fracture of the patella life was refered to us on No ember 14 1027 On first c amination the symptoms ere all referred to the patella and there vas distinct local ten lerness o r its lo er pole More car ful evamination demonst ited in addition a gre ustick fracture of the upper nl of the t b a It was an interesting fact ho ver that the degree of tend rucss over the site of facture as much less a ute than o e the lo r margin f the patella and that the disability to all appear ances vas due to yeakness t the atta hm nt f th pat llar ligament to the patell rather that the fra tur hich as firmly impact la dipro ded sufficient stability for eight bea i g

TERMINOLOGY

The authors have taken the liberty of des ignating this le ion as Larsen Johansson's disease of the Patella They have done so with the idea of conforming to modern usage as exemplified by the accepted terms O good Schlatter s disease of the tibini tubercle Kochler's (1) disease of the tarsal scaphoid Legg Perthes (15 and 19) disease of the femoral head and Kienboech's (11) disease of the carpal semilunar a first de cribed in English by Dr Kellogg Speed

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CLINICAL SURGERY

I ROW THE NEUROSURGICAL CLIMIC OF THE UNIVERSITY HOSPITAL

THE RADICAL OPERATION FOR THE RELIEF OF TRIGEMINAL NEURALGIA

BY CHARLES H TRAZILE MED. SCD. FACS AND M. J. GAPDMIP. M.D. PHILADELPHIA

CINCE 1908 when Spiller first proposed sec tion of the sensory root as a substitute for excision of the Casserian ganglion the sensory root operation has been the accepted procedure the world over However certain modi fications have been made in the operative details since that time. In 1918 it was proposed and the suggestion has since been accepted that the motor root should be conserved. Still later it was found unnecessary to sacrifice the entire sensory root so that what has come to be called subtotal section of the root is now accepted as the proper procedure. For example if the pain is not referred to the ophthalmie distribution the inner fibers of the root are not divided. The importance of this innovation in absolutely eliminating trophic keratitis only needs be mentioned

The operation curries with it unqualified assurance against recurrence the hazards of the operation have been so reduced that the mortality rate is less than one half of 1 per cent

Generally speaking there is no operative field with more frequent anatomical variations with more variations as to amount of hemorrhage and with a wider range as to what might be regarded as an operation devoid of any great technical difficulty. It is so beset with puzzling situations that only with a background of wide experience can one approach the next operation



Fig 1 The relationsh p of facial nerve to incision left side

with a sense of confidence. Even with an experience of 520 operations in the Neurosurgical Clinic of the University Hospital certain new pictures present themselves.

PREPARATION OF PATIENT

A careful physical examination is made including a renal function test. A blood pressure of servation is made in all cases. When the blood pressure is oo or over the patient may receive an alcoholic injection. With rest and rehef of pain the blood pressure is often reduced. Again an alcoholic injection may be given as preliminary treatment when because of pain on swallowing the patient may be improperly nourished or from lack of sleep exhausted. A week of rest with proper attention to diet and water intake has a tery beneficial effect.



Fig 2 Location of skin incision with relation to ear right side





Is Ct fipelit | 4 VII fipelit | Fidil | IL fitte | I fidil | IL fitte | IL fide | IL f

As a precrution again t keratitis i drop of i per cent selution of atrepin sulphate is instilled in the eye the night before and the mornin of the operation

The hair is haved only from the temple alout

8 centimeters also be the zig min and josteriorlisto a perpendicular line through the mistoid process. Twenty minutes before the operation the patient is given the usual preoperative hypodermic of grain of morphine sulphate and it is of grain of atropin sulphate.

THE OPER TION

The various steps of the of eration are dejacted the tecompanium illustrations. I some sees the structures on the operating, table the illustrations de not seem to portray the picture faithfull. In various attempts to secure accurate reproductions the artists have failed to give the proper jersnective and seem unable to ny re-

sent the init mich details accurately. How ever the illustrations here rejor duced will serve at length as a guident, the text

P sition | the pii nt | I reference is given to the sittin p sit n f r e e al reasons there is less blee ling, the patient requires less ether and the field f peritin is on a level with the eves of the operate.

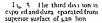
I mesh to The unstitute of choice is other administered by the pen dr p method. The anisthesari pequa while the operative field is lein prepared by the pen dr prepared by the pentent is anisthetical by the time the drupeness are in just in his sown as the graphen is exposed it is injected with really centimeter of 2 per cent solution for sometimeter of the continued and the operation of an interest of the sometimeter of the solution of the



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In 5 a 1 lim function in dural hath of a n lion (ling roule)



In 8.1 Dural sheath of ene l lar tand could haston in heated by dett. J. Im. (larger cale)

quite well be performed under local inasthesia but a general anastheue is preferred by the patient. Subjects of trigominal neuralga usually have reached the limit of hum in endurance and dread the thought of additional discomfort. The use of ether in such small quantities in no way adds to the risk of operation.

The cutaneous incision is composed of a hori zontal limb a little over a centimeter in length along the superior border of the zygoma and about half a centimeter in advance of the tragus of the ear and of a vertical limb extending up ward about 45 and curving forward 2 centi meters (Fig 1) I ressure by the assistant on the temporal artery where it crosses the Agoma will keep the field bloodless while the cutrincous incision is being made. As the temporal artery is cut across in the lower horizontal limb it is grasped with a hamostat. The resulting skin flap is dissected free of the underlying tissue reflected forward and sutured to the drapenes thus avoiding the use of a s lf retaining retractor (Fig.)

Misculo aponeurotic incision. An incision is made in the temporal fiscia and muscle—just the reverse of the cutaneous incision (Fig. 3). The resulting musculo aponeurotic flap after it his been separated with the perioranium from the temporal bone is reflected backward and sutured to the draperies. Thus a sufficient area of temporal bone is exposed without the use of retrictors. This incision is so designed to be quite within the hair line and to avoid injury to the superior branch of the facial nerve.

Remo al of bone. A small perforation in the skull is made with hammer and chisel below the level of the middle meningeal artery and the opening enlarged with rongeur forceps (Fig. 4). In opening 4 custimeters in drameter usually is maple. The lower margin of the opening must correspond to the base of the skull.

Separation of dura The separation of the dura from the skull without liceration may be very difficult especially as one approaches the base of the skull where it is most adherent and of most delicate texture. When the dura is snugly adherent it is advisable to begin the separation on either side of the cranial defect. A small per foration is made in the dura in the center of the exposure to allow the escape of cerebrospinal third throughout the operation (Fig. 5) reduces the bulk of the intracranial contents and thus facilitates the elevation of the tempor il lobe With gentle pressure by means of an illuminated brun retractor especially designed for this oper ation the operator commences to s parate the dura from the floor of the middle fossa Usually this is readily accomplished with a septal elevator but occasionally the dura is so adherent that lacer ations of the dura may be unavoidable

The operative field at this stage is kept blood less by means of a specially designed curved metal aspirator and by the judicious use of dental cotton tampons

1pproach to the gangton. The first landmark is the groove of the middle meninged artery on the floor of the fossa. When this is seen the operator follows it to its termination at the formen spinosum where the dura is separated gently to avoid rupture of the artery sufficiently fore and aft of the formen to permit a clear view of the artery as it emerges from the foramen. The middle meningeal artery and foramen is thus exposed with a small dental application and the



Fig. S so tdpl lpdth oot tp bhdgngl tj thihdd

foramen is plugged with a wisp of cott in so as to obliterate its lumen (Fig. 6). The artery and yein are then divided with a scalpel.

Exposure of the ganglion The next objective is the mandibular division of the trigenmal next as it enters the foramen ovale. This foramen lies just messal and a little anterior to the foramen spinosum and is partly hidden from vice by a small bon eminence on the flor of the fossar This eminence is removed with a chiesel (1/2 or 2).

The next step of the operation is the most important and a metimes the most difficult. The dura must be separated from the sheath of the ganghon. Often the line of cleavage is chilicult to find or the dura may be intensely adherent to the ganglion's sheath. One must word perforat in, the dura or penetrating the shorth. For this separation a septal elevator combined with a suction apraratus all in one will be found helpful and pressure is made directly over the foramen o ale until this line of cleavage becomes mini fest (F1 8) The dura 1 separated from the sur face of the sangh nic heath as far forward as the maxillary di 15100 and backward and inward until the arachnoid covering of the sensory root comes into view. One ulic centimeter of cent no ocain is injected int the ganglion the ether is discontinued and the operation con cluded under regi nal anæsthesia

Expasure of the cas x root. One should be familiar with the appearance of the line of junction between the ganglion and root. It is usually readily reco.gni ed in various ways and the dura must be dissected far enough mesad so that an ample exposure of the root may be obtained. The facility with which fractional dursion of the root



Ing. The twith lifth a york Ledp hook lyftn Mitootbho

is accomplished will depend upon the liberality of this exposure. Without such exposure the meets of the subsequent steps is an impossibility. To expose the root an oblique incision is made in the durf is heath parallel and a little in front of the posterior margin of the ganglion (Fig. 8 a). The sheath is bluntly separated on either side of this incision and the sensory root is exposed to view (Fig. 8 b).

Expanire of the moto root. When the sensory root is elevated the motor root may be seen on the flor rof the skull as a separate isolated fasciculus. Sometimes the motor root is composed two fractuals. It is quite separate and distinct from the sensory root and may be seen to pass behind the grigilion. If there is any question about its identity, it may be identified by stimulation with an electrode (Fig. a).

Section of the sensor vool. There r muns now only to section as much of the root is may be required in the individual et e. The upper and miner third of the root supplie the ophthalmic division the lower and outer third the mandbular division and the intermediate hiers the mandbular division and the intermediate hiers the invitality division. It is most cress jain is referred to the mivillary and mindil ultra divisions this portion of the root must be searched. Section of the necessary fracticul is readily accomplished with a small scaling after the fascicular been isolated on a specially designed blunt hook (Fig. 10).

He nostans There are only three sources of hamorrhage that may require attention (t) A small dural samus which may be injured when the dura is separated from ganglion in the neighbould of the second division. To control this a timp muscle graft is sufficient (2) The peripheral stumps of the middle meningeal vessels which

are clamped with two Mackenzie silver clips (3)
Oozing from the middle meningeal artery in its
groove in the antero inferior angle of the parietal
bone. To control this it is usually sufficient to
separate vessel and dura entirely free from the
skull at this point.

Bound closure Bleeding no matter how sight should be completely controlled before the wound is closed. The tiny dural incision and any incidental laceration of the dura should be sutured. The wound is then closed with interrupted sutures in each tier temporal muscle temporal aponeurosis galea and skin

POSTOPER ATILE CARE

The immediate convolescence as a rule is free from any great discomfort. Sometimes nausea

and somiting may disturb the patient for 24 hours These are probably of central origin and are not affected by medication. Five hundred cubic centimeters of a 5 per cent solution of glucose is given by enteroclycis should there have been much cozing during the operation. A post operative headache will yield to aspirin or codein If the entire root has been sacrificed corneal complications may be prevented by keeping the lids closed and continuing the installation of atropin for 4 days with irrigations of boric acid solution 3 times a day. The head and shoulders are slightly elevated A cathartic is given on the evening of the first postoperative day and an enema in the morning. The patient is allowed to get up on the fifth day when the statches are removed

TROM THE DIVISION OF SUICINE VEHA CLINIC

AV ASI PLIC MI THOD OF INTESTINAL ANASTOMOSIS

T TATE WITH TAKEN MEDITAL TO ME

HE most fascinating chapter in the remain e of surgery deal with pritty min iver on the gastra inte tinal tra t In the har ter the parteraph on int final and time. represent the most intro-una level in it f the surgical art from the technical tinh ant The earner enders in fining man till ra the factor of afety in intertinal are ryach at the search francical which will ir wil frth removal faffen hn le im frth r tritin of phy role accountd room with at information and ith the low tempital mertality and merbility. The multiplists I pritts pr ce lure and the cy luty n full all minut a rations testify amply to the nar rting a to the interect in uch al ntu e II I et develop a clean type tana tim a ha realt I in multiple levices and m the 1 mans f which rec mmen I them els fr m th ir s rs in m u ne and many because fitter innate comiler someness are 1 me lt h fi r

Kerr in a clasical parer ral let r th Section on Surgery of the American Mechal Association in 19 tracel the le liment f intestinal urg ry fr m the eirlie t ree r l m t the preent tim. He mmen led Lintrink Sien of Ciner rull helm r # lich ut had the treatment funt tond sunl in l called attention to type to suture in literal plicate) from the the cere nal portan u recovery fr m into tinal perform n and lly battle yound raci lental penetrati halro sulted from the 1 lutinitin of the rt neal costs f the inte tine a in t the pariet's preventing effusi n and atamination. In 181 Travers tulli hela eries fe periment n animal sh win that intestinal wound haled by a glutinatin an I call lattent nt the fat that the p c hal been kn an to the me licil rrufe sion fr m e than fur hun lrul v ar The suturin f the junt neal le wound in 18 tly Antim Temlert f Piri who e name i till a sated with inte tinal suture put at practice the principle that intestinal unl healed by a thesio inverted perit neil at thu a fun lamental principle was established buch has I en largely responsible f r the succ sful evoluti n of this branch of surgery Murchy's butten in 189

markel an ther als me ul quent to sheh meet that re timl ame pularized keen ab ut 30 df feet in that there have been ab ut 30 df feet in that fine that letter de erhed in the literature and he lime if offer, la most admiralle a fit in a tim it which answers all the lun limentally a quentity equirement in lis readily accomplished. It last in stitch method has the processor of the method has the last literature and the most consideration of the method has the last literature and last li

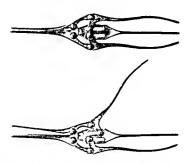
Irier titel that after Halt 1 nı meer itt mit t k li i iticani t mosi f llovin unt full retuithirty two sciarate and chi tin t m th I hav I en priocl Fadure of m th l t l m uni er ally ad titel i lue number furrin () the hire ard of many it il tun liment il prin iple finte tinal urg rs in the leare that miph has perfect pritis product () the lake famplicity in m t f th m th l pre-crited (a) anatomical biferen e leny n a leguate va cularization to there teles I unrous allebause of the ary I limit m the 1 figure the lowel and (a) fully e t rec a c that the large b wel in which three furth tith recetion are neces arily p rl rm l + highly term alle under ob tru ti con hti a and that it manu ulation is t the pralfrgs m thruhth lowelvall le rate the fact that the reaction and lang temo i

The 11 > 1 upply of the large bowel in each of it live in set from inconstant and the anasto m sing ar sfrequently uncertain. The r lit half

around to the middle of the transver e colon re ceives its blood supply from the superior much teric vessels, together with the rest of the ab orptive portion of the gastro intestinal tract and the left half which is concerned mostly with storige receives its blood supply from the inferior mes enteric branches of the norta. The an istomosis between these two sources of supply is often in complete or absent and for this reason failure of union with resulting necrosis and perit initis may occur when the resection has been made in the distal arm of the transverse colon or the upper part of the descending egment. Another our e of failure in the open m thod of intestinal and to mosis has been the invasion of the fat of the mesenters in the \ where a wedge has been Here necrosis is probably mest fre quently walled off and occasionally rupture through the suture line occurs into the lumin of the bowel but more often abscesses result from leakage infection and failure of the an istomosis

The healing of intestinal wounds has been splendidly dealt with experimentally by Halsted Mall Hertzler and others I egenerative changes according to their experiments, demonstrate that the healing of the peritoneal wound takes place by direct transformation of lymph into connective tissue without passing through the granulation tis sue stage if there is no infection. Agalutination of the resected ends under firm pressure is another principle of intestinal surgery which is advan tageously employed in making a clean closed Mall's experiments showed that under pressure the diaphrasm which is a result of turning in the margins becomes destroyed by necrosis and at the end of the fifth day the slough separates leaving usually a clean surface muscularis mucosa is completely regenerated at the end of about, weeks and the raw surfaces of the anastomosis are covered over the slonghing away of this diaphragm sometimes has been accompanied by secondary humorrhage occasion ally fatal but this is an exceptionally rare complication Quick herbing of intestinal wounds is due to approximation of the peritoneal surfaces and inserting suture material only deep enough to catch the submucosa which is the important structure in the anastomosis (Figs 1 and)

The clamp which I have devised I offer not with easy confidence that it will be adaptable for intestinal anistomosis under all conditions and circumstances but with the hope that it may be a valuable addition to the surgion's armamentarium. I feel that the simplicity of its arrangement and the ease with which it may be applied and manipulated commend it. I have found it ex-



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tremely advantageous in joining the large bowel end to end or side to side and the large and small bowel end to side. I have used it in twelve reactions of the colon in which these three types of anastomosis have been carried out satisfactor it. Secondary hamorrhage or the formation of a diaphragm in the lumen has not occurred in any of the cases. The good results I believe bear out the experimental advantages demonstrated by Graham in Mann's Hoboratory. In working on a series of dogs he midd the various types of anis tomosis without leakage hamorrhage or the formation of a diaphragm. (Figs. 3.4.5 and 6.) I quote his report.

A series of experiments was conducted in order to determine whether the 1 nulm clamp for closed intestinal anastomosis was more satis factory than the usual open method. For this purpose two groups of operations consisting of end to end end to side and side to side anastomosis on the colon were performed on dogs.

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TROM THE DIVINOV OF SUICEPL MILLOCITY

AN ASEPTIC METHOD OF INTESTINAL 1X 12 LOMOSIS1

TITE WILLIAMS MEDITALS I

HF most fascinating chapter in the man e of surgery leal with pratise man it or en the gate into tinal trat In the elan ter the para raph a ant timal and timal represents the mit intrium livelia at f the surgical art from the technology that The earne ten leavor of many months in the the factor of afety in int stimil are ery in licitic the sar htrinileal whih will ir the trile removal of offen lin lean to the retrain of physical are quild rium with it it imit it i and with the live to maintain mortality a l m rhility The multiplists f pratic dures and the e lute n fall abd mital i ra ti ns to tife amily to though the action as well a to the interest in eich al enture. The lar t level par lean type farition is him ultil in multiple livic and mith I mins f hills recommend them els from thors read and ness and many lucaure fith it can tecimiler somenes are do m It has r

Kerr in a clasical paper call treath Se tion on Surgery f th America Mel il Ass crattin in 19 trace I th I vel I m nt f into tinal surgery from the earliest rearling to the tresent tim. He mm ill linfrink Sin (Cas pull him s & hih ut I ned the treatment frate toul unl and called attent not type futur a liberty plication I right this the ica i mil i utin u recovery fr m into tinal perf rate a cau 113 lattle wound rice lental più triti n hill sulted from the a lutilation file port nul cuts of the intertinent anist the pariete are v nting effusin til c ntiminatin In 18 Travers collide a rice feweriment in animal h in that int timil w unl hall by a glutinit in in leille latt nti n t the fiet that the prehillion known themelol profes in fr m re than fur hun la l year The utu n f the pentageal ele f the youn line 18 (by Ant no Lembert | f Lanwh se nam 1 till a sociate I with inte tinal suture put int practice the principle that interinal von i heale ila alhesim of the invertel pritinal it thus a fun lamental principle a tallished hills ha be n largely responsible for the su ces ful colution of the branch of surgery Murchy butt n in 180

markel another alwance sul equent to which inte tinal recettan became pagularized. Kerr rt I that there have been about 250 dif for nt in th 1 funte timal sutures described in the la teentury and be him off offere I a most admirall a itik anist moj which ans ers all the fun limental requirements and a realily much he ! He lasting stitch metho! has priselvers the fact is in my hand. I feel sure that it is no f the most serviceable types of learnante traslana t m a

In r tate I that after Halstells pioneer attempt t 1 t 1 ; i ; tic and t mix t following int tinilr tin thirts to eparate and dis tm t m th I have I ten propied I ailure of m th 1 ta 1 m uni creally adopted i his mainly to four races (1) the heregard of many vital tun lim intil prin if his of intestinal ure ry in the learner that mple has perfect ration in the lune () the lack of simplicity in m t f th m th I pre crule! () anatomical lifference I main adequate va cularization to the rectelent unre 'maile i cauc of the nce s ery I had meth I of joining the lovel and (4) failur t re muze that the large bowel in

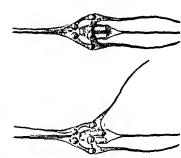
high three f urth f the re cuts as are nece sardy | rf rm 1 1 highly permeal it under ob tru tis n hts n and that its manipulation i it in f liewed by perit neil contamination due t the real f rgim m throu h the binel vall I put the fat that the resects mand anastomoss have I on I m and tharou his asentic manner

The lifference in the anat mical construction f the lire and small Ivijon of the bowel influin ic as I rally the technical maneuvers utilicable the little bare based is much this ser than the mall be well and its tunica pro-1 11 ht h 1 beneatl the endothelial layer of pithchum in I whi h e ntun lymphatics and bl I ve I is ften replace I by fat Under hr me al tru tive con litton ats normal pr me il lity streatly increas d and al orption and inf tion take place. The p ri taltic action of the la ge b el i letimtely more p werful than that f the mall I el so there i more likel hood that trum on the suture line will cau e leaka e

He blood upply of the large bo el in each of its livi i ns i citen inconstant and the anasto mo in arcs frequently uncertain. The right half around to the middle of the transverse colon re ceives its blood supply from the superior me en tene vessels together with the rest of the ib orp tive portion of the gastro intestinal truct and the left half which is concerned mostly with storige receives its blood supply from the inferior mes enteric branches of the portry. The unistomosi between the e two sources of supply is often in complete or absent and for this rea on Fulure of union with resulting necrosi and peritonitis may occur when the resection has been made in the distal arm of the transverse colon or the upper part of the descending segment Another source of fulure in the open m thod of intestinal anasio mosis has been the invasion of the lat of the mesenters in the \ where a wedge has been Here necrosis is probably most fie quently walled off and occasionally ripture through the suture line occurs into the lumen of the bowel but more often abscesses result from leakage infection and future of the inistomosi

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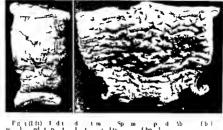


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transky advanta, cous in joining the large bowd and to and or side to side ind the large and smill bowd and to side. I have used it in twelve resections of the colon in which the e three types of unstomosis lave been carried out satisfactor it, secondary hamorthage or the formation of a draphrigm in the lumen has not occurred in an of the cases. The good results I believe bear out the experimental advantages demonstrated by Craham in Manus alboritory. In working on a series of dogs, he made the various types of ans tomosis, without leakage hemiorrhage or the lorination of a draphrigm. (Figs. 3.4.5 and 6.) I quote his report.

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The results of the foregoing experiments ere clean cut. In the first c ntr l group all of the animals hed of peritonitis 1thin 5 lay second group there were no evilences of perits nitis and there were no deaths. Observations at subsequent operations 6 to 8 weeks later revealed that the anastomisis functioned sati factorily the bowel was not blate i provincial to the anastomosis \ stu ly of the operative sites after their removal from the body licite I these facts absence f circular c nstricti n almost comr lete als nce of a draphragm within the lumen and absence of liminuti n in the diameter of the lumen

Such results prompt the conclusion that the clamp under consideration offers an entirely satisfactors closed asentic method for anastomasing the large bowel in the dog Furthermore it is realily conceivable that the clamp should be even more applicable to operative procedures in man v hen one considers that the preceding results were obtained in spite of certain handicans that the intestine of the dog offers to such procedures namely its relative smallne's thickness friabil its and tendency to contract on manipulation

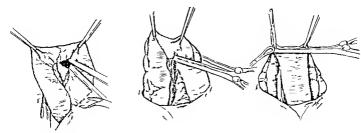
The instrument is a three bladed clamp suffi ciently short to facilitate adaptability readily molife and narrow enough to permit the



Fgs Edted tmo



Fg 6 Sgtt 1 wof dt de tm pltab c fdiph gm tst of p tn



1 ig to plication of clamp to il um. The blood supply in the me entery has been tied off in I the clump 1 appled at an ingle o as to of time 1 wid 1 lumen for the anastomo is. The bowel is di ided with cultury.

advantage of the principle of agglutination be tween the peritoneal coats of the crushed bowel and at the same time to avoid excessive clums: ness which comes from the attempt to suture over a wide instrument. The central blade is the fixed point against which the two lateral blades operate independently. The fulcrum which permits the steady pressure is in the handle there is a ful crum on each side of the clamp. The length of the entire clamp from tip to tip is 2 5 centi meters Each blade is 75 centimeters long and the central blade is o , centimeters wide. It is 3 millimeters deep and the blade portion when closed is 8 millimeters deep. When the clamp is in use the posterior peritoneal coats of the two arms of the bowel are in direct approximation separated only of centimeters by the central blade and the anterior surfaces of the two limbs of bowel to be anastomosed are separated by the entire thickness of the clamp. Firm pressure and agglutination keep the limbs of the resected ends in accurate apposition after the application of the suture which covers the point of the clamp but which necessarily is not drawn tight over the handle portion until its withdrawal. On with drawal of the clamp the end suture is put in and the whole line of sutures on the anterior surface is drawn that without contamination. The dia phragm must be broken out with the fingers through the lumen

Control of hemorrhage is dependent on the crushing of the vessels and occasionally perhaps secondary hemorrhage may take place. It has not occurred in the cases in which I have used the clamp and I believe that it is a much overesti

It, S a The clamp tho n bein applied to a point elect d on the transer e colon for the colonie end of the anatomous 1. An ell pitcal portion of the colon is temperature of the colon as temperature of the colon as temperature of the colon as temperature of the colonies o

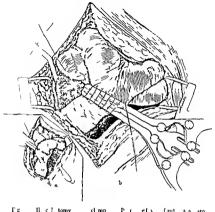
muted danger in closed anistomosis. The formation of a disphragm after operation has not been observed in the experimental laboratory or in a series of resections on human beings.

the small bowel is shown approximated at the point

It may be well to discuss the three types of anastomosis somewhat more in detail operation on the large bowel for carcinoma or any other lesion that has produced long standing obstruction the two stage resection should practically always be performed. I am convinced that this should always be carried out in the left seg ment of the colon but certain conditions in the right segment may make it advisable to perform the one stage operation. However carcinoma in either arm of the colon presents a somewhat dif ferent problem from tuberculosis stasis or other lesions that require surgical intervention and since surgery of the colon is usually directed toward the eradication of malignancy I have gradually come to believe that all carcinomata of the colon if they are causing any obstruction whatever should be operated on in two stages



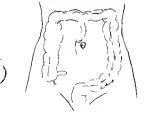
Tie 9 I osterior layer of sutures be ne applie l in end to side anastomosis Clamp is turned over



r Il c! tomy clmp Pt rl; fsut sast

ILLOCOLOSTOMY

I have used the clamp in performin, ileocolos tom; in the right half of the colon between a suit able site in the transverse colon and a point in the ileum about 3 centimeters from the ileocreal



Ibi Oprt mpltd ih diled f the lumen is tu d n ddr pped back t th bd m n while the pro im led a t mos d dt s de w th th trans erse col

valve. In order to secure as large an opening as is desirable the clamp is put on the small bowel at an an le and the bowel is cut across the end toward the cocum being invaginated by a purse string suture and dropped back to be removed with the colon at the subsequent resection An elliptical piece of the transverse colon is removed with the cautery after the application of the clamp to the selected site. The clamp and the mobility of the bowel permit easy handling and the sutures are first put in on the po terior side of the bowel which may be brought under the eye by turning over the whole clamp This permits the accurate approximation of the peritoneal coats of the boxel on the under surface of the anastomosis because here the two arms of the bowel are in juxtaposition. After this suture is in place the clamp is again reversed and the anterior line of sutures applied in a manner identical with that employed in closing the duodenum following partial gastric resection The sutures at one end of the clamp have drawn the bowel together over this end and the clamp is now released and vith The agglutination of the two ends of bowel under the steady pressure keeps it intact

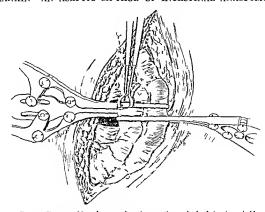
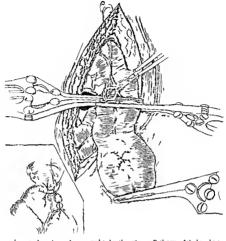


Fig. 12. Division of bowel proximal to the growth one limb of the clamp holding the end to be anastome ed the other limb shown closed

and the anterior layer of sutures is pulled taut and tied. Leakinge at this stage his not occurred in any of my cases. Another layer of silk sutures is inserted around the entire area of anistomosis and the fart tags and omentum are wrapped tround it to guard against contamination and leakage. The ingers of one hand are invaginated through the anastomosis to break out the agulutnated ends and prevent obstruction. The secondary resection of the colon takes place in about two weeks.

END TO END ANASTOMOSIS

I have usually employed this method of end to end anastomosis in the sigmoid but I applied it in two cases of growths in the descending colon and in one case of carcinoma in the transverse colon Dramage procedures were carried out in all cases preliminary to the resection and anasto mosis Certain portions of the sigmoid in which more carcinomata occur than in any other seg ment of the colon offer ideal sites for resection and anastomosis I am not discussing here the growths low in the sigmoid or in the rectosigmoid because of the questionable desirability of reestablishing the intestinal continuity when carci noma has invaded this portion of the gastro in testinal tract. One is frequently loath however to make a permanent colostomy in the middle and upper part of the sigmoid and subsequently to resect all the bowel distriction in such cases the clamp anastomosis may be carried out most satisfactorily. In this situation one may practi cally always be certain of the idequacy or in adequacy of the blood supply to both ends since it may actually be een. The end to end anasto mosis is readily accomplished over the clamp in much the same manner as the end to side ands tomosis the clamp being put on the bowel with the handle away from the operator thus making the posterior suture line more readily accessible following resection. I have found it advisable in most instances to place the clamp superimposed by a small Payr clamp on the upper end of the lowel to be resected and to cut between the two with the cautery This permits one to gauge the exact amount of bowel below which may be sac rificed with the possibility of establishing anas tomosis without tension and with idequate blood supply to the ends Having satisfied oneself on these two points a similar maneuver is carried out on the distal end and again the resection with the cautery leaves the bowel ready for anas tomosis over the clamp Occasionally if the bowel is freely movable and inspection can be carried out rapidly both ends of the bowel may be caught in the clamp one clamp being used above for the resection I at tissue should be removed from the immediate vicinity of the suture line but once the anastomosis is made such structures as



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omental taus are s u ht and suture lover the line to give it additional strength fn resection of the sigmoid the bowel should always be returned into the peritoneal cavity. In the ligation of the blood vessels supplying this segment of the bowel it is necessary to dissect the peritoneum of the mesentery from both sides in order to reach the vessels satisfactorily. This leaves two livers of peritoneum which may be approximated after the resection and on which the anastomosed bowel may lie This is an additional protection to the suture line and peritoneum from the lateral parietes or if the anastomosis lies deep in the pelvis from the bladder or from the broad ligaments in the female. The anastomosed bowel should always be attached to the suture line to re enforce it and establish every precaution against leakage. After the anastomosis has been completed the diaphragm at the point of umon is broken out by invaginating the finger through it and the abdomen is closed without drainage

I am confident that this step is eye ptionally im portant and experience in a case of growth low in the sigmoid in which anastomosis was carried out and shich could be mobilized only by the clear me out of the entire hollow of the sacrum and the separation of the growth from its attachments in front encourage the belief that such a conclusion is correct. In this particular instance there was a dead space in the hollow of the sacrum and a tube with a wick of gauze was placed for drain The patient's convalescence was stormy which because of the subsequent drain a with out leakage of the bowel was believed to be due to the tube in the pelvis Since then I have al ways closed the abdomen tightly and have not regretted it in any ca e

COLOCOLOSTOMY

Lateral anastomosis in the large bowel 15 probably most often indicated between the arms of the transverse colon or between the tran verse

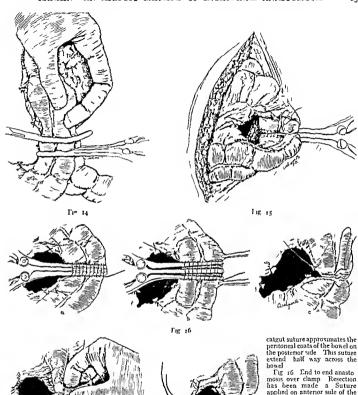


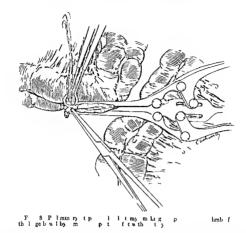
Fig 14 Segment ready for removal with cautery One clamp above the anastomosis line catches 1 oth limbs of

the bowel to be removed

To 15 Tre first layer of sutures 1 being applied posteriorly Clamp 1 rotated laterally and a continuous peritoneal coats of the bowel on the posterior side. This suture extend half way across the

applied on anterior side of the bowel with continuous perito neal stitch b Clamp unlocked ready to be withdrawn after which the suture will be drawn taut inverting the end of the bowel c Completed operation and final row of sutures being put around the anastomosis
Fig 17 a The fin ers introduced through the anas

tomos s to break up the agglutination which forms a dia phragm b The operation is completed with to layers of sutures Closure of the rent in the mesentery is made with interrupted catgut sutures



colon and segment of the sigmoid as a prelimi nary stage to resection of the splenic flexure or descending colon for malignancy. I have made a colocolostomy bet een these two segments and in the transverse colon several times over the clamp (Figs 18 and 19) I have not as vet had an opportunity to employ the clamp in making a lateral anastomosis between two divisions of the small bowel but this is rarely desirable accomplishment of lateral anastomosis over the clamp between two mobile segments of the colon is readily carried out in the standard manner Points are selected which are to be approximated The clamp is applied first to one segment an elliptical piece removed above it to open the lumen and a similar maneuver to open the lumen into the other segment Anastomosis is accomplished by continuous suture two layers being employed In resecting the bowel for carcinoma it is well always to use at least one layer of silk or linen because of the uncertainty of the healing powers of the intestine due to desiccation and anæmia In operating on benign lesions one rarely needs to employ sutures other than the absorbable type because of the adequate a gluti

nation and repair but if mali nancy has under mined general resistance and impaired the repair ative processes a non absorbable coapting, suture is desirable. The secondary resection following colocolos

tomy is carried out after 10 days or 2 weeks in the usual manner the ends of the bowel being amputated and inverted without opening. If care has been taken to place the sutures only as deep as the submucous coat the operation may be ac

OBSTRUCTIVE RESECTION

complished with absolute cleanliness

I have found the clamp advantageous in the performance of the so called obstructve resection which I have come to regard as the operation of choice in many cases of carcinoma of the transverse colon (Fig. 20) Obstructive resection in reality employs the satifactory features of the Mikultic operation without violating the principles of this procedure as it is usually carried out. Mikultic operation was originally an exteriorization procedure applicable to mobile seements of bowel that did not require handling of difficult maneuvers in attempts at mobilization in the procedure as the seements of the control of the c

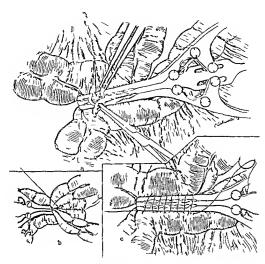
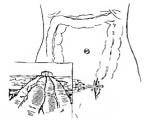


Fig 19 Colocolostomy a Opening in two segments of bowel being made with cautery b I osterior suture line c Anterior suture line

tion it did not moreover sacrifice the blood supply to the segment Failure to observe these two criteria have resulted in the application of the procedure to many cases in which it was totally contra indicated and the violation of the principles that growths in the colon that are adherent infected and permeable may not be handled except with the gravest likelihood of peritoneal contamination. It is applicable to a small scirrhous growth without glandular metas tasis which occurs in a mobile segment of the bowel particularly the sigmoid and which may be brought outside the abdomen without hand ling or difficult mobilization and sacrifice of blood supply In elderly patients and in patients in whom the risk is great it is distinctly useful but for the average large growths which must be mobilized and handled and from which con tamination is feared by spread of organisms throughout the peritoneal cavity the substitution of colostomy or some drainage procedure and sub sequent resection with anastomosis has resulted in my hands at least in an enormous lowering of

the mortality rite and in more satisfactory opera tive results than when the Mikulicz procedure was used. It is an axiom that the highest mortality attendant on all types of operations on the colon follows operation on the transverse colon where the growths are more easily accessible. The reason for this is clear. In all likelihood because of the accessibility of the growth primary resection is most often attempted. Failure results from two main causes first inadequate blood supply and second pentionitis from direct contamination from the growth at the time of resection.

Since January of this year (1928) I have per formed this operation in 5 cases in which the clamp was left on without failure. The safety of this operation is due I believe to adequate preoperative preparation the use of spinal ances thesia and the selection of cases in which the operation may be performed without submitting patients to tedious and difficult procedures of mobilization. In cases of obstruction to the colon if segregation and proper preparation from



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the standpoint of cleansing the bowel and re habilitation is instituted the obstructive type of operation may be frequently performed in the transitires segment and the sigm of hearing the clamps on 4 days ithout incontinence to the patient from the obstruction

Usually for 4 hours and often f r 36 hour or longer follo ing a spinal anasthetic and re section the bowel 1 in a state of paralysis and there I little or no ten lency to the f rmanon of ga and listention Total abstinence from foo l and drink by mouth increases the likelihood of the patient's bein, carried through 4 days without discomfort Fluids are supplied subcutanecusly or intravencusty thus keeping the ater balance normal The thirst of which the patient usually complains is allayed by small six s of water after the fir t a hours or by sucking a lemon or orange occasionally The advantage of the clamp in this procedure is that the bowel which should be brou ht well out of the abdomen so as to insure adequate blood supply may be opened on its proximal side should listention and di comf rt lemand it after the first 36 hours. The 1 eri toneum is sutured snugly around the bo-el-but suture are not placed in the wall of the basel When the clamp is removed entirely in this tyle

of resection a spur remains which may be cut out by the application of clamps after about weeks it remains then merely to close the colostory opening in the ordinary manner to complete the maneuver. I have found that when the dia phraigm is cut through widely following these exteriorization procedures closure takes place spontaneously in a high percentage of cases.

I am convinced that successful outcome follow ing resection and anastomosis of the large boxel especially in malignant cases depend more on a lequate pre operative preparation and reha bilitation measures than on technical procedures hewever highly desirable the latter may be Di regard for the fact that virulent organi ms have a normal habitat in the large bowel in creasing in number and virulence under certain untoward conditions if obstruction is present perhaps operates more against successful out come in any type of mechanical procedure than any other one consideration. Con equently ade quite re perative preparation of the bowel con sisting of Irainage procedures after the institution of measures to cleanse the bowel and the routine establishment of a proper diet consisting mostly of carbohy trates an I fruit junces which leave little resi lue increase markedly the chances of satisfactors recovers. Grade I operation under spinal and thesia likewi e have been hi hly sitis fa tory departures from the usual routine Selec ti n of cases for resection and the judgment to refuse to operate in hopelessly advanced cases will lower the operative mortality in the whole group and I believe will result in a higher per centage of cures in a given number of cases than the tendency to pre s the operation in every in stance in which the results are uncertain crea ing the horizon of operability and the insti tution of more radical measures for resection may be accomplished only by attention to minute de tail an if believe it is in this field that an aseptic type of rese tion hen feasible while but an med lent in the suc essful operative management of the e cases 10 sesses many advantages

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\RTHROPL\ST\ OF THE K\TI 1

BAWHILIS COMBILL MD LACS MIMPH TISSE EL

ESTORATION of fun tion by arthroplasty and subsequent treatment is a more intricate problem in the knee than in other

joints. This is due to the fact that the knee is the most complex articulation in the body and is dependent for stability upon ligam nious support on all four sides and in the interior of the joint.

In June 19 1 the author's firt report was made on arthroplasts of the kn e before the American Orthopedic As ociation and in Janu ary 19 3 a further report was made before the Orthopedic Section of the New York Academy of Medicine. In the first report including 4 cales the re ults were far from satisfactors in the sec and 16 more cases were discussed which showed a marked increase in percentage of good result Since the second report there have been it addi tional arthroplasties of the knee or a total of iti cases and sufficient time has clapsed to determine the actual character stamina and durability in a large number of ca es in which function has been restored This after all is the real test of the value of the procedure

Arthroplasty is an operation for the re-e tab ishment of function to an ankylosed joint by the reconstruction not only of the bones but of all of the component parts—the muscles ligaments tendons and fascie. The operation is only the first step in the program of restoration of function as careful systematic after treatment is essential to success.

Differentiation between the types of ank vlosis is of no practical value although it is important to distingui h the degree of fusion the prognosis and treatment in fibrous and bony ank vlosis is identical. Penarticular restriction of motion is considered only as a complication of either type.

The indications contra indications and limitations of the procedure vary to some extent in the different joints but in the knee they may be enumerated as follows

I Arthroplasty may be considered routinely only when two conditions—acute pyogenic infection and trauma—are the causative agents of ankylosis or restricted motion. It has been found that the etiology in a very large percentage is an infection by pyogenic organisms such as the strep tococcus staphylococcus gonococcus and pneu mococcu. These organisms in primary intra articular infections erode and disintegrate the

cartilinge and superficial bone from within but do not invade the shaft to an extensive degree. That all evidence of acute infection must have subsided before an operation is performed is such a well-known surgical maxim as hardly to be worthy of mention. Trauma or the crushing of joint surfaces tearing of the periosteum and multiple fractures are so soldom causative agents of complete ankylo is in the knee as to be almost negligible. However when incongruity of a joint following communited fractures cau es pain on movement arthroplasty is indicated although a considerable range of motion may be present.

Multiple ankylo s even as the result of a progenic infection obviously renders the problem more difficult and the prognosis less certain as the important after treatment to restore function may be inhibited by ankylosis of other joints

3 In monarticular tuberculous joints opera tive procedures vithin the joint are seldom indi cated hecause of the probability of lighting up a Intent tuberculous infection. In ankylosis of both knees the disability is o great that even the risk of a recurrence of tuberculous infection is war ranted In tuberculosis of the knee solid osseous fusion is rare however in those in which osseous fusion has been induced in the early stage of the infection by open operation before extensive de structive changes have occurred there is greater probability of eradication of the pathological process. It is therefore concervable that in future years arthroplasty will be increasingly indicated in cases of this type and the scope of the procedure in the knee will be materially enlarged

4 Arthroplast may be employed in low grade progressive arthritis such as rheumatoid arthritis and arthritis deformans but the progno is is not favorable and at present the procedure in such cases is in an experimental stage

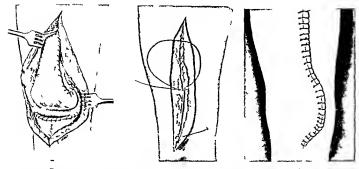
5 Position is an important factor. Ankylosis in full extension or not over 30-degree flexion is more favorable to arthroplasty. Flexion contracture of over 80 degrees renders the result more uncertain.

6 Shortening of more than 3 inches as a re sult of destruction of bone or lack of growth contra indicates mobilization as further excision of bone would be required and the end would not justify the means

7 Abnormal osseous structure as demon strated by the \ ray may be an important factor

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Fig 4 The new joint has been relined with a free 1rns plant of fascia lata which forms a double layer 1 liween tibia and femur 1s suttered deep in posterior compart ment of joint and co ers anterior surface of femur \

ly, 5 Fig 6

ns pedunculated flap covers posterior surface of jatella

I ig 5 The deep and superficial fascic are closed by

ret continuous sutures

I is 6 The skin is closed in the routine manner

TI CIINIQUE

In our first cases we attempted to remodel the joint so that it would conform anatomically with the normal articulation but we met with a number of failures. We have therefore devised a more simple procedure which will induce function without regard to anatomical detail.

In remodeling the knee joint no routine tech nique is applicable to all cases the procedure must be modified to accommodate the following conditions

r Position (a) extension or slight flexion (b) flexion with and without external rotation and values

2 Distribution of ankylosis (a) panankylosis or complete bony fusion of the patella femur and tibia which occurs most frequently (b) fusion of patella and femur with apparently normal tibio femoral articulation (c) tibiofemoral fusion with a freely movable patella

PANANKYLOSIS IN EXTENSION

An E march bandage and tourniquet are ap plied on the upper third of the thigh in order to make the field of operation bloodless. The incision is begun from 4 to 6 inches above the knee at the outer border of the quadriceps tendon and extended downward with slight convexity inward parallel to the medial aspect of this tendon ter minating just below the attachment of the patel

lar tendon to the tibia. The skin and superficial and deep fascit are incised the incision then passes through the junction of the quadriceps tendon and the vastus internus muscle. Dissection is made to free the quadriceps tendon from the femur and the bony union between the patella and femur is chiseled loose. All ligamentous struc

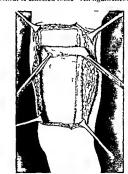
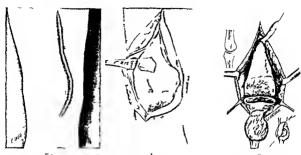


Fig 7 A free transplant of fascia lata is removed from the opposite thigh



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in determining the prognosis and indications for The chances of success are de arthroplasty creased when the structure has been transformed for 1 or more inches adjacent to the articular sur faces Old dense eburnated bone when found for a considerable di tance on both side of the joint in the bones forming the articulation is not favorable for the reproduction of a movable joint Such a condition is usually caused by a virulent osteomyelitis, the result thereof being a low grade bone tissue which bears the same relation to nor mal bone that fibrous scar tissue bears to normal soft to sue Healthy spongy bone should form the articular surfaces of the ne v joint O teo porosi or bone atrophy from disuse should di appear and the structure should return to normal when the position of the limb will permit func tional use. As a re-ult of functional adaptation of the o cou structure after many years from plete to 5 of motion a medulla or central canal may be formed completely traversing the joint from above lownward and surrounded by cor tex which is developed by the transformation of cancellous bone into den e bone. In such case sufficient base may not be obtained to form a satisfactory joint and further the restoration of function to the atrophic muscles would be

difficult

8 Extensive scar tissue with adhe ion of the skin to the bone renders the procedure unsuitable unless preceded by plastic measures to invest the joint completely with soft freely movable tissue titempts to close such defects at the time of arthroplasty invariably meet with failure because of the relighting of the infection or sloughing of tissue.

9 The most favorable age is from adolescence to 40 years althou h it is not so much a question of years as of the character of the tissues of each patient. Arthroplasty is conta indicated in children as the epiphyses may be traumatized by operation and further it is impossible to secure proper co operation in the after treatment.

To In large obese individuals especially women the musculature and ligamentous structure are always deficient. The ligaments should be conserved and great care should be taken to remove as little bone as possible in making the joint space as loose flail joints are likely to occut.

11 In the selection of cases for arthroplasti the social and financial status of the individual must be taken into consideration. The procedure may be employed in all young a fults whose occupation is not ha ardous or in those who can be rehabilitated.

TECHNIQUE IN PANANKALOSIS IN FILMON

When ankylosis occurs in less than to degree flexion the anterior structures are redundant and the quadricens tendon can always be retricted to the outer side. After removal of sufficient bone if the posterior expsule is contracted and exten sion cannot be obtained stripping of the peri osteum from the posterior surface of the femur above and the posterior surface of the tibia below for 1 or 2 inches will usually overcome the con tracture and permit the knee to be completely extended after which the procedure is concluded

Correction of rotation and valgus or subluvi tion can easily be made in remodeling the joint

When ankylosis occurs in flexion of over 50 de grees it is advisable to do a two stage operation as follows by a posterolateral incision the poste rior portions of the condules of the femur are ex cised thus removing about 1 inch of bone at the point of osseous contact to permit greater exten sion or reduce subluxation if present I urther extension if necessary may be secured by sever ance of the hamstring tendons. A cast or fix ition apparatus is applied with the limb extended as fully as possible but without the slightest tension

If the necessary degree of correction ennot be attained at the first attempt the cast is removed at the end of weeks and gradual correction of the flexion deformity is made by means of a special apparatus otherwise the east is worn for 6 weeks. A brace is then applied and walking per mitted for about 2 months before proceeding with

arthroplasty

TECHNIQUE IN FUSION OF PATELLA AND FIMER

In fusion between the patella and femur with an apparently normal tibiofemoral articulation the skin incision is made as already described the quadriceps tendon is dissected free posteriorly and the union of the patella and femur is severed by a chisel The interior of the joint is carefully inspected and division is made of any strong fi brous adhesions that may be present. A broad sheet of fascia lata is dissected from the outer aspect of the same thigh and folded inward be neath the quadriceps tendon and the raw surface of the patella the deep surface of this fold facing the patella and quadriceps Should extensive scar tissue be present in the affected limb a free fascial transplant is taken from the opposite thigh

TECHNIQUE IN TIBIOFEMORAL FUSION WITH A FRILLY MOVABLE PATIELY

Tibiofemoral fusion rarely occurs with a freely movable patella. This condition may be a sequela of acute infectious arthritis but is more often the result of a virulent osteomychtis extending for a considerable distance into the shafts of the tibia and femur with direct bone infection across the joint space. The anterior portion of the joint may have been walled off by inflammatory exit date and prutected from the process similar to the phenomenon so frequently seen in the abdomi nal eavity. If the ostcomvehitis has been exten sive the indication for arthroplasty is most amstionable

Should arthroplasty be deemed advisable, the patellar tendon is retracted to the outer ispect or if contracted is lengthened by the / plastic method. The new joint is then remodeled accord. ing to the method already described although the

pedicle flap to the patella is omitted

This prucedure for arthrophisty of the knee is advantageous because (1) stability is better in sured by the broad space of contact between the one eardyle of the femur and the one tuberosity of the tibia as well as by the conscription of the quadricens tendon and lateral ligamentous strue tures (2) loss in length is not appreciable as the greater amount of bone is removed from the poterior portions of the eundvies rather than from the longitudinal dimensions and (3) the tech nique is simple and the contour of the buny

surfaces is easily remodeled

Since the last report the approach to the joint has been radically modified. I ormerly the in verted & meision with an additional longitudinal meision passing upward at right angles from the center of the & was employed. This has now been entirely discarded as it has been found that the incision which has already been described is quite ample for exposure of the joint moreover when one meision is made at right angle to an other a formation of adhesions and sloughing may occur at the point where the incisions meet. It is also found that the longitudinal incision usually heals better than an extensive transverse incision in an extremity. This is probably due to interfer ence of the blood supply to the part as an exten sive transverse incision severs more blood vessels

For the past 4 years we have routinely em ployed transplants of free fasera lata as we have found this the most satisfactory material for interposition. In some of our early cases, we applied pedicle flaps and prepared animal membranes but we have almost entirely abandoned their use Prepared animal membranes possess the disad vantage of foreign body irritation invite infection and may be extruded. Fascia lata trans plants from animals as described by Koontz have

Loot Amos L 1 Sg o 61 5 3 536 9 7 l x tures are dissected all periosteally from their at tachment t the tibit and femure It curely contracted the qualriceps ten len may be length ened by the 7 plastic method therwic it should he retracted outward. The tibulem ral unum is completely severed in lantilate as a completely no attenuot is maile ti flex fireibly even in til riti cases as fracture of the l wer extremity of the femur are early su taine land may anstitute a serious complication. The knee i then fully flexed gring free access t the ray bony ur face of the tibia and femur | the p trirpr tions of the concludes at the femor are removed and the int rom lylar n that thus I literate l The lower extremity of the femura make a next from alove lownwar | an lfr mlefr lakvarl Only the ab olutely e sentral am unt fl ne i removed from the length of the f mur th la ger portion of hone being tiken fr m the p steri r surface f the c n lyles In the av more nace will be formed and the length of the limb affected very slightly if it ill. The uppe extremity of the tibia s xci li litil a i sille in or ler to reach healthy panent in With a wood car er s chisel this surth a mal slightly concave from before la kwar l f rming a large shall cavity f r arti uliti n vith the n dule of the femur. After even a take I ne there must be at least 1 in h 1 ii t p 1 c hen manual tra ti n i male n the til i cannot be acc mpli he | m re precin fren be obtained by hisecting the perioteum 1 it right from the femur and tibia \ att mili mil to reproduce the pine f the tilly r the int re n dylar notch f the femur for there will be n crue al ligaments to revent lateral di clae ment If the articular surfa e are irr gular in h literal di placem nt may early occur I ringin the r regular surfaces t gether the olve u mechanical damage when mott n is in titute l. The lat ral beamont f the init mult be conserved in riler to a voil institulity in learning ile taken not to tear tret h r ver the h ments lu inoperation

The riw urfa c are next upper simated and the alien ient f the entire extremity i te tell if varus r ulgu i i re ent m re b ne i re mo elfr mei h urface intil i jerf eith traight high elfram i Peger li s fishe po itton of the normal hind p cial are should be taken n t t pro luce valgus. Futur v vehi learin must le direct and in a traight line.

Our attenting next breefed to the patella of vhich the patella of vhich

fr, much to allow the tendinous filers to fall back, and along the clee of the p stemor surface. All urfaces are smoothe! with a large rasp recese are curfully scarched and every purtuel of the elone i remove! Just below the patella and on the p stema spect of the patella tendon vill le found a mass of fat and at times remain f snayyal membrane. This is severed at the junction with the tibia and dissected from below up vard into a flap with a broad pedicle which stitched to the margin of the tendous fiber thus inve time the postenor surface of the patella. This is an important step for in those cases in in hankyl six recurs adhesion begins between the patella and femure and is the most efficient.

pr blem in the retrait nof mobility.

The contur of the new joint has now been confleted and prepared for interposition of the membrane. As the former infection may have preduced him is in the sit its uses about the prating area of the affected limb and in order that it is a leves ne surgery to the one member the transplrint is be to bitained from the opposite

hi_nh

I long inci ion i made on the outer aspect of the thigh and a strip of fascin late about 4 or s in hes in with and 8 or to inches in length is remove! The superficial surface of the mem I rune is placed next to the bine its tibers are I osely woven and more readily in luce the re e tal h hment of circulation. To facilitate motion the sm oth gliling surface is r laced within th joint f mine the interior of the articulation This memi rane is a lace lover the lower 4 or 5 in he f the anteri r ast ect of the femur cover ing the no terr r wall f the superior compart ment of the joint. It then pa se from before La kward o er the nextly formed condyl of the f mur and to titched posters rly to the po terior ap ule of the 1 int a high as possible thence it i brou ht torwar lover the new articular sur face t th tuber sity f the tibia terminatio on the antera a pect of the tibia. All free e lges are stit he l ith out nuou chromic catgut ill over the margin f the joint Thus not only i there interp elt o lavers of fascia lata bety cen the joint surfaces but ne lav r is interpo e l between the qualracep tendon and the tis nes on the ante rior surface of the femur. The pedicle flap vlich has already been describe I interposes an adh ti nal laver bet een the patella and femur The joint apsule fa cra and skin are sutured in the routine manner chromic catgut being u ed for the leep structure and lermal suture for the skin Moderate traction is applied and the limb is placed in a Thomas splint

TECHNIQUE IN PANANKALOSIS IN 111 MON

When ankylosis occurs in less than to degree flexion the interior structures are redundant and the quadriceps tending an always be retracted to the outer side. After removal of sufficient bone if the posterior capsule is contracted and extension cannot be obtained stripping of the periosteum from the posterior surface of the femulation above and the posterior surface of the tibra below for 1 or 1 inches will usually overcome the contracture and permit the knee to be completely extended after which the procedure is concluded.

Correction of rotation and valgus or subluvition can easily be made in remodeling the joint

When ankalosis occurs in fixing of our bode grees it is advisable to do a two stage operation as follows by a posterolateral meision the posterior portions of the condales of the femurance, cised thus removing about a inch of bone at the point of osseous contact to permit greater extension for reduce subhavation if present. Further extension in necessary may be secured by severance of the hamstring tendons. A cast or fivation apparatus is applied with the limb extended is fully as possible but without the slightest tension.

If the necessary degree of correction cannot be attained at the first attempt the cast is removed at the end of 2 weeks and gradual correction of the flexion deformity is made by means of vspecial apparatus otherwise the cast is worn for 6 weeks. A brace is then applied and walking per mitted for about 2 months before proceeding with

arthroplasty

TLCHNIQUE IN FUSION OF PATEULA AND FIMUR

In fusion between the patella and femur with an apparently normal timofemoral articulation the skin incision is made as already described the quadriceps tendon is dissected free posteriorly and the union of the patella and femur is severed by a chisel. The interior of the joint is carefully inspected and division is made of any strong historia adhesions that may be present. A broad sheet of fascia lata is dissected from the outer aspect of the same thigh and folded inward be neath the quadriceps tendon and the raw surface of the patella the deep surface of this fold facing the patella and quadriceps. Should extensive sear tissue be present in the affected limb a free fascial transplant is taken from the opposite thigh

TECHNIQUI IN TIBIOFEMOPAL FUSION WITH A FRIELY MOVABLE PATELLA

Tibiofemoral fusion rarely occurs with a freely movable patella. This condition may be a sequela of acute infectious arthritis, but is more often the

result of a virulent osteomychitis extending for a considerable distance into the shafts of the tibra and femur, with direct bone infection across the joint spice. The anterior portion of the joint may have been willed off by inflammatory exidate and protected from the process similar to the phenomenon so frequently seen in the abdominal cavity. If the osteomychitis has been extensive the indication for arthroplasty is most questionable.

Should arthroplasts be deemed advisable the patcllar tendon is retriated to the outer aspect or if contricted is lengthened by the / plastic method. The new joint is then remodeled according to the method already described although the

pedicle flap to the patella is omitted

This procedure for irthroplasty of the knee is advantagious because (1) stability is better in sured by the brond sprice of contact between the one condule of the femur and the one tuberosity of the tibra as well as by the conservation of the quadriceps tendon and literal ligramentous structures (2) loss in length is not appreciable as the greater amount of bone is removed from the posterior portions of the condules rather than from the longitudinal dimensions and (3) the tech inque is simple and the contour of the bony surfaces is easily remodeled.

Since the last report the approach to the joint has been radically modified. Formerly the inverted Uncision with an additional longitudinal meision passing upward at right angles from the center of the L was employed. This has now been entirely discarded as it has been found that the incision which has already been described is quite ample for exposure of the joint moreover when one incision is made at right angle to an other a formation of adhesions and sloughing may occur at the point where the incisions meet. It is also found that the longitudinal incision usually heals better than an extensive transverse incision in an extremity. This is probably due to interfer ence of the blood supply to the part as an exten sive transverse incision severs more blood vessels

For the past 4 years we have routinely employed trunsplants of free fascal tata as we have found this the most satisfactory material for interposition. In some of our early cases we applied pedicle flaps and prepared animal membranes but we have almost entirely abandoned their use repared minial membranes possess the disadvantage of foreign body irritation insite infection and may be extruded. Fascin late trins plants from animals as described by Koontz' have

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l een emplove l'in one arthroplasty. This tissue is very well brine and gives apparently atisfactory results although sufficient time has not elaused to determine its actual value.

In a previous report, the author described hem arthroplasts, which is a employed where only portion of the joint was fuel as between one condise and the opposing tuberosity. In such cases we have since fund it more expedient to do a complete ruthroplasty, consequently, hem arthroplasty has been entirely discar le l in surgery of the knee.

There have been no errous operative complications or fitalities. Even a severe infection requiring, this right Dakimstion dies not necessarily prevent an excellent result. However ankyl singmay recur even if the most careful after treat ment is carried out. In this series of cases even those which have been classed as further than been benefited by improved function of the laboratory of the deformation.

AFTER TREATMENT

Immediately after operation moderate traction papeled and the limb is placed in a hinged Thomas knee splint and locked in the extended position no motion is permitted until the operative ound has entirely healed. This usually requires about 10 days. At the end of that time a rope 1 attached to the center of the hoop of steel and above to an overhead frame. A cound rope is fastened 1 the lot ever timit of the Thomas splint passing through a series of pulleys to the head of the bed. By the adjustment of these two ropes and desired angle may be main.

tained and by gravity of the leg under direct control of the patient active and passive motion may instituted. The patient soon finds that consider able motion is possible—ithout prin. The after treatment does not require exceptional fortifude on the part of the patient if function is cultivated gradually.

Great care should be taken to increase motion early though not too fast. At the end of 19 days, there should be not over 30 legrees of passive motion in the hare and 1 at the end of 50 days motion in the hare and 1 at the end of 50 days motion in the hare and 1 at the end of 50 days not more than 40 legrees. If motion is increased too rapidly, the attrophic ligaments may become over stretched. Furthermore if osteroporosis—if frequent complication—occurs the osteroporotic bone will be compressed thus increasing the joint spice and causing irregularity, as well as adding to the danger of producing, a loose field joint Active motion should be increased synchronously with passive motion and muscle function should be cultivated gradually until restored to an adequate degree.

Complete extension is es ential Flexion of 60 to 80 degrees gives the best function and a member which can be used for all practical purposes

If the joint is stable at the end of 6 weeks the a Thoma caliper brace with an adjustable joint at the knee for gradual increase of motion if there is the siehetes osteoprosis a portion of the weight should be borne by a Thomas ring Foll weight bearing should not be allowed until the structure of the bone is practically normal. Dis astrous results may occur as late as 9 months after operation because of flattening of the articular special or the articular structure of the bone is practically normal.



Fig. 9.1 (left). End results hown 7 years after arthrophisty for anhylosis be to cen the pitella and the famur and reconstruction of the quadriceps from the vasti mucles. The 9.7 Same case as hown in Liquie 9.1. The knee is flexed while the patient is cated.

surfaces Weight bearing without support is not advisable until a fur degree of power has been developed in the quadriceps muscle. Extreme care must be given to the re-education of the extensor groups of muscles the flevors must also receive due attention. When the patient begins to wilk the knee should be diligently exercised until the maximum power has been restored.

Britement force is unnecessary and in our opin ion has little if any place in the after treatment however if employed in resistant cases not more than to degrees of increased motion is induced while the patient is under anosthesia as other wise a severe reaction may impede the progress of the treatment

Very often after 6 weeks or months the joint will be quite tender and irritated and ankylosis will appear to be on the verge of recurrence re gardless of all treatment In such cases rest for several days followed by cautiously increased evercise will usually produce marked improvement Many cases discharged from the hospital as apparent failures were observed months later and found to have a very excellent result with satisfactory range of motion

There has been much speculation as to the physiology and histology of an ankylosed knee Recently the author had occasion to incise a successful arthroplasty of the knee r year after operation. The findings were as follows

An internal lateral incason was made in the left knee through the former operative sear. The skin and super fic al [asca were found to be norm. The sip ule and per articular structures were much increased in thickness possibly to about 1 inch. Below the capsule a definite joint pace about one half the capacity of the normal knee was reached which extended between the articular surfaces of the tubia and fermur and well under the patella and quadriceps tendon. A few adhesions were found be tween the quadriceps tendon and the posterior wall of the

cavity but the edid not interfere in any way with move ment. Very small amount of joint fluid was observed the vas less than is found in the normal joint but was sufficient for lubrication. The articular surfaces were smooth editening and regular and covered with a dense layer of throus tissue resembling in every detail the free trinsplant of a cia lata which was interposed at the original operation. There was go degrees forcible voluntary flevon and full extension.

A section was removed from the lateral aspect of the joint through this fascia beneath which was found a critiagnous tayer covering the bone. A small portion of bone with the cartilagnous and superfeat librous layer was excessed for microscopic analysis and will be reported at a later date.

The present report is based upon the analysis of 111 arthroplasties of the knee in 101 patients of whom 98 were white and 3 colored. One case had 3 arthroplasties on one knee had operations on one knee and 6 had arthroplasties on both knees.

In 1922 a complete analysis of the first 24 cases was made by the author in an article en titled. Arthroplasty of the Knee.

The foci of infection were not so carefully sought in the cases first reported as in those subsequently treated Only an approximate conclusion can be reached as to the origin of infection even in the later cases since most patients were first examined long after all acute symptoms had subsided As many of the patients did not know the source of infection and others were reticent as to their history at is not unreasonable to as sume that in a large percentage the pathological process was probably gonorrheed in origin. It is the author's opinion that gonorrhoea is the most frequent cause of a monarticular arthritis de spite the records of this series and the fact that the knee is more often involved than any other joint In 57 patients operated upon since the

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first report the source of infection is known and is as follows

Of the 57 patients 50 ga e a hist r_1 I blool stream infection from distant f(x) and f(x) ba f(x) in fection from penetrating woun f(x) f(x) by within due f(x) comp und fractures an f(x) from without due to gumbhot wounds. There is only a case of this number in f(x) in f(x) by fractures f(x) crushing of joint surfaces uncomplicated by acute purelent infection. It is therefore conclude f(x) that truman at a siscerated with infection is a negligible factor as the cause of ank losis.

Since there are so many factors to be considere I as influen in the en1 results of arthr plasty a gro s compilet in of results of 87 case operate I upon since the I rst report would be greatly mis lea ling. Hence for analysis the 87 casesart class 1 eed as foll s.

I Ankylo is in young adults as a result of an acute pyo eni infection confined to one knee the joint leing in the position of extension or in not over 40 degree flex in

2 Ankyl sis as a result of acute pyorenic infection in malp ition with flexion of o er 80 legrees

3 Mult ple ankyl sis or ankylosis of two or more joints a a result of a pyogenic invision 4 Ankylo 1 as a result of virulent osteomyelitis extending through the joint and involving the shafts of all bones comprising the joint or partici

5 Multiple inhalosis as a result of or durn the course of pro re are arthritis of a low grade type as in rheumatoid arthritis or arthritis de formans

6 Ank losis in chil iren as a result of progenic infection

Of the 87 cases reported since 1921 50 con formed to the first gr up of the classification as ank-loss occurre I in one knee in the position of extens n or sli ht flexion. The results of opera the treatment were as follows:

It is interestin, to observe that the percentage of successful arthrol lasties in the e cases has in creased as more experience has been guined. The results fig. cases operated upon during the versigos and in 7 can be rejorted. Seventeen of the were successful only it was a failute. The entire serie show that about 50 per cent were successful. In the there was restoration of function in quiper cent of the 18 operated upon in 1920 and 1927.

There were 8 ca e with ankylosi in malposition or over 80 de ree flexion

One of the successful eases had slight lateral instability and requires a brace. In this type the two stage operation as de cribed is now being employed.

In multiple ankylosis from pyogenic infection the prognosis is not so favorable because the restablishment of function is obviously more difficult when other joints are ankylos of Of this class there were 7 cases of ankylosis of the knee of which were bilateral totaling of arthroplistics.

As yet there is only a case of bilateral anky losis of the knees in which function has been restored in both knees one knee has 40 degrees of motion the other 30 degrees. Sufficient time has not elapsed to state the permanency of the result or degree of motion which may be required. In 2 of the cases no other joint in the lower extremity was involved and there was no difficulty in instituting function. In a case with ankylosis of the knee and hip on one side an excellent result was obtained in both joints. This group belongs to a special class and should form the basis of a separate report.

In 6 cases operated upon there had been an extensive osteomyelitis passing through the joint leaving dense scar bone

In all of these infection of a virulent nature was relighted and mobilization of the joint failed although function of the limb was improved by correction of malposition. From these results therefore it is evident that arthroplasty is contra indicated when ankylosis has been caused by osteomyelitis.

Those cases of ank losis resulting from a low grade progre sive arthritis involving many joints also deserve separate consideration. In the series there were 6 cases and to arthroplasties belonging to this type

Res Its	C se
Success	1
Impr ved	2
Failure .	7
	_
Total	10



I'm if (left) Indiresult 8 / years after arthro pla ty Complete active extension of the knee is possible firit B Sam ca cas that in firite it I howing the range of flexion when the ratient is scated

In the improved cases the patients had fur motion but no voluntary control one had a fluit joint. However both patients were well pleased as they were enabled to walk on crutches and sit more comfortably. In this condition arthrophasty must still be considered to be in the experimental stage. There have been some fair results in other joints, which makes the procedure worthy of further investigation. Of course no case is operated upon until all other measures such as removal of foci of infection have been completely exhausted.

Arthroplasty of the knee was performed on 4

Res It	C
Success Lailure	
Total	-

Forty degrees of motion was restored in the successful case but valgus developed after operation and osteotomy is indicated. This patient the eldest of the 4 was 14 years of age. From this small number and the results secured in joints other than the knee the conclusion has been

reached that in children arthroplasty is contra-

indicated not only for the knee but for all joints

Of the 111 arthroplastics infection was relighted or instigrated in 19 cases. In 6 of these
cases there had been an extensive osteomyelitis.
In 4 cases the infection was apparently due to
irritation of the chromicized pig bladder which
had been interposed between the joint surfaces.
In 4 cases the results were excellent although
complicated by a viruleot infection in of these
Dakin tubes were inserted in every direction and
irrigation was cootioued for weeks.

At the present time there are 43 cases under observation in which function of the knee varying from 35 to 120 degrees has been restored Only 4 cases have as little as 35 degrees of mo

tion and this may increase in time. The average is oo degrees. The most efficient and durable joint has not over 80 or 90 degrees of flexion which is sufficient to permit walking without hmp

and sitting in comfort

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An estimate of the results of arthroplasts of the knee should be expressed in the terms of func tion and endurance and not in degrees of motion As more experience has been gained by ol serving the complications and important factors in the evolution of the procedure, the operative technique an I after treatment have been refined an I the scope of the procedure has been materially increased

A full report of the entire 43 cases in which function has been successfully restere I would be impractical however there are 6 cases of special interest, which will be described briefly

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th ol to

t nh b

This case is most interesting on account of the unusual course the sinuses which persisted over a long period of time an I the excellent result

H W m ! s far hd d'n t htyft mt tht fth lftk b t tdl lct idl I'm m ll lted the ed b hhd h d t Th ed l m lddtt h gs Il of th ь , fth rt It pl to pt ne tn c dot ndap mn m df lys th l t dt m d1 f th d \ th hwdh t pro cld tbdt m df mtheg pp f th t t f pt thptll gtt d ut th t p t tι th pt ty slid f t mplid lift 3 m th the ry th g pp ra fth jat d t th t 11 11 11 11 tb lp m blek ad th p t t ldt bt th r t the plants of the theory of th

t dadat th nd fom the the e w s go der e m to with oly ight I ty the sltwscndred c II nt

At th d formoths then tetret ned hor diff tity dits algsdfmty Th ty th k with of beta ce n the external co del fth fmu duet of po s

This case illustrates the necessity of careful observation over a lon, period of time. It is mentioned in order to demonstrate a late and unusual complication which might have been avoided if such a possil thty had been known prior to that time The cause of this complication was the to rapid increase in motion which was not commensurate with the muscle power

BW m le q y rs of age had nkylo of th litk with implet of so face had never to the litk with implet of so for each to the ptill dim d till fth quide potent d The to firm it toulate n n ml The et leys mpo df tu fthe im ith nu etlevs mpo as a fit

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se k the ml Suffit ml poew t dt bl the patet t dth keeflly dt walk the petbl lmp

This case is of special interest on account of the fact that a functional quadricens was restored after complete destruction

C E4 NH k im 1 gy r 1 g had ky?

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th ol t do tat te ls the free rth pl t te is the frttw fldth thrdn sf l F tl p to a the jo the bee t ble with nor mld lth ghith y sho t siep lf t butth mg fth jo t d the ptl p tofth upp f dt the tr ft th m n t b

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This case is interesting and unusual in that function has been restored to the hip and knee of the same limb

A STUDY OF ARTERIAL OCCUUSION BY MEANS OF AUTOGINOUS FASCIAL STRIPS

BYP W MCNIMY MD TACS INDICHTINSTILN MD CHICAGO 1 mth Dn am ff pe m t 15 grs \ th est U

FCFV1 studies dealing with the surgical neclusing of bland vessels have been con ducted along two principle lines. In the first instance there has been a rather considerable amount of work done in developing special clamps or devices for the purpose of producing gradual o clusion of the vessel lumen. In the second in stance attention has been directed to the reaction of the vessel and surrounding tissues to the use of such lighture materials as silk linen catgut and especially fascia

The study of methods of gradual occlusion has had as its incentive the necessity of gradually diminishing the flow of blood through a diseased or injured vessel in order to stimulate the forma tion of a collateral circulation while still maintain ing a supply sufficient to prevent immediate tis

Suc death

The present study is concerned with a method of gradual occlusion of a blood vessel by trans plants of fascia placed about the vessel and anchored in such a way that continuous traction is made in a constricting manner. The use of fascia in vascular occlusion is admittedly in no wise a new procedure nevertheless we feel that our results obtained in experimental animals war rant the report of the method which we have

The various methods of gradual vascular oc clusion may be briefly summarized as follows snares of silk metal or catgut have been placed about vessels so that they can be tightened at intervals These devices were in most instances unsuccessful because infection traveled along the protruding snare and caused either thrombosis or secondary hamorrhage from vessel erosion In other experiments bands of silver or aluminum were so constructed that they automatically tightened about the vessel or could be tightened by exposing them at subsequent operations The bulk of these devices and their tendency to irri tate the tissues and corrode the vessels rendered their use somewhat hazardous

In 191 W S Halsted (3) reported his experi mental use of strips of aorta fascia lata and intestinal wall The following quotations which have been taken from his original report ade quately summarize the results of his series of

experiments

in April 1912 I operated upon two dogs partially occluding the norta of one of them with a piral nortic I and and the other with a cuff cut from the ame we el-Strij of north vere employed rather than fascia for example I ecau e I hope I that the elastic ti sue in ca e it li I net endure might at least erre its purpo e for a time

sufficient to cure an ancurism

At the end of two months one of the dog was killed and I was plea ed to find that the cuff which had been u ed in the experiment was apparently organized and had not tretched to any appreciable extent. Above the cuff the nortic pul e was forceful but below the constriction it was very feeble though countable and accompanied by a thall The other dog operate I upon at the same time and in the same manner except that a spiral band of aorta instead of a cuff had been employed died about three weeks after operation (Death due to pneumonia) In this instance the norta had I cen completely occluded by the piral aortic strip. The welt like band had not stretched and seemed to be organized. The aorta in being split lon itudinally was seen to be greatly wrinkled and almost occlude lat the site of the ban !

Since then about 25 similar operations have been performed. We have learned ho vever that whereas the spiral bands seem to be perfectly safe there is dan er in employing the cuffs. In to instances of twelve or more experiments one of the mattress sutures taken to hold the flaps of the cuffs together cut part way through the cuffs and thus being in contact with the aortic wall wore a minute hole through the ves el through which the animal bled to death Such an accident can hardly happen with the employment of the spiral strip for not only is the strain on the stitches very slight when this form of I and is u ed but even if it were so great that a thread might cut through the spiral at any one point it could hardly be I rought to bear on the aorta in such a way as to wear into

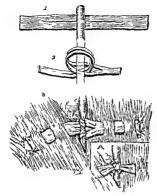
Since Halsted's report of his experiments, there have appeared from time to time reports of isolated instances of the use of fascial cuffs for occluding vessels when it was desirable to use proximal ligation in the cure of a peripheral angurism

Brooks (1) in reporting the use of fascial bands for vessel occlusion concluded that the ligatures cut through and the bands loosen

reason he found objection to their use

Campbell (2) recently reported 3 cases of peripheral aneurism in which fascial cuffs for proximal lightion were used with apparent success Little is mentioned in these reports save the charcal features of the cases

Reid (5) describes a method of occlusion with fascial plugs which are placed upon the blood vessel and held in place by a constricting ligature Thus no trauma occurs to the intima as the lumen is obliterated by the flattening of the vessel



lk litp dfpplin Ti tipliith I tild dil the hith little Tp Litim III. Tief dth hii djim II. mftyft I th flki teywifilt;

In our vork little opportunity is offered f r the fascia to I osen an I there i n likelihoo I that the sutures will c me in such contact vith the vessel will that er sion might result

TECHNIOLI

Our meth 1 is a set in the dissecting of flaps of fascia 5 centimeters long and a centimeter side from any a e sil le fascial plane. In our experi ments in 1 as these strip were taken from the anternor layer of the rectus sheath. This fa cial strip as further prepared by its bein freed of fat and then sht lagitudinally t within about t) entimeter f each and (Fig. 1). This strip is then I laced under the vessel and neend threaded through the lit of the opposite end thus forming a five II t at ut the vessel Traction on the end erve n t nlv t constrict the ves al but also to angulate t slightly. The next step consists in thef reag fa mall pair of artery forcep through adjacent mu | maninterrupte imanner and the gri ping f the en l f the fascia t draw it through the mus le fil cr The tension may now be secured by the fixing of one end of the fascin and

gentle traction on the other until the peripheral pulse is diminished as much as desired. This tension may now be preserved by sutures passed throu h the end of the strip of fascia into the muscle bell.

RESULTS OF INVESTIGATIONS

After interval varying from 2 weeks to 4 months the condition of the constricted vessels and the fascial transplants was investigated.

The changes in the blood vessels were quite constant. In 5 dogs there was complete occlusion of the fem rail arters at the site of the frescal strip. It was impossible to epirate the vessel from the frescal strip expect by shrip dissection. The vessel showed no apprient of struction of its intima which was lon itudinally folded upon itself. In each instance the lumen could be ditted with a small probe. In one case the vessel was markedly constructed but a faint pile could still be felt distal to the fascal strip. When pened the vessel lumen presented much the same appearance is in cases of complete occlusion.

The fascril transplants remained fixed in each instance and there was a firm fibrous union between the connective tissue of the musel lundles and the fibers of the fascral strips. This characteristic manner of muscle and fascral union which has been described in these experiments lears out the contention of Koontz (4) as to the healing of the estructures.

In one of our dog it was interesting to note that when the fascial strip was first applied and the

leg completely relaxed by flexion that the pulse peripheral to the fascial strip could be plainly felt however when the leg was completely ex

tende I the pulse was obliterated

In or let to study the comparative value of this meth of a thick of fascial strips used as simple ligatures we ligated the femoral arteries of 3 logs with narrow autogenous fascial strips (IT). A) We found that the partial occlusion of the vessel which was established at the time of operation liright disripparate because of the loosening of the fascial strips. We believe that this regular tendency of the strips to loosen may be explained on the basis that there is decidedly less tendency for union of the component parts of a transplant than there is between a transplant and the vascular uses of adjacent structures as mour methol?

SUMM VRY

r The method of fascial occlusion of blood vessels is free from many of the faults found in methods now in use

By regulating the tension on one end of the fascial strip any desired construction of the vessel may be fairly constantly maintained

No suture material can come in contact with the vessel and cause an erosion of its will

- 4. Instead strips are not arritating to the surroundin tis ue
- 5 Inscirl strips have no tendency to act as foreign body irritants to the vessels themselve

THURINGS

BRESS B Limation of the ports J Am M As 10 (Kxx II

CAMBILLE J. I. In 111 Inn I in the treatment of ancure in South M. J. 1326 xix 9

3 HALTEL W S Ochur n of the forth with strips of fica Ann Sur, 10 3 lvm 183

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THE TREATMENT OF TRACTURES OF THE NICK OF THE TEMUR BY DOUBLE LIC CASIS IN HATD TRACHON AND TRIANCHI TRUSS SUPPORT

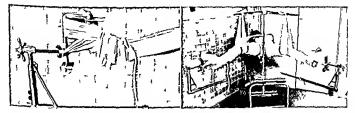
BY JAMES I METHOMSON MED TACS TINGEN NERSON

ITH the introduction of the so called Whitman position and wide abduction spica cast in the treatment of fracture of the neck of the femur the greatest contribution to the treatment of this condition was added to sur gery It is a positive method of maintaining po a tion and alignment of the framents provided adequate traction is instituted during the applica tion of the cast through the traction devices of the modern fracture table

One disadvantage which we encountered in its use was that quite often after several weeks shortening and loss of position were found to have developed in spite of the application of a widely abducted spice cast extending from the tips of the toes to the axilla. In addition there

was considerable discomfort at times in the dorsum of the foot ankle or knee and especially about the abdomen and the t. This was particularly true of elderly obese patients. Furthermore, the pelvis on the injured side was usually so severely tupp d that considerable permanent disability often o curred

It was found however that by immobilizing both the uninjured leg and the fractured member in vide abduction under traction only a low pelvic band of plaster was needed to maintain position so that the upper abdomen and chest could be left free of plaster thus adding consider ably to the comfort of the patient. This also permitted equalized traction on both sides of the p lyis and eliminated the tipping of the pelvis



Ing I (left) The foot is bound ath muslin banda eto the traction device of the fracture table. Mole kin traction strat with rope end are applied to either side of the teg extendin from well up the thigh to the anki Fig. 2. The patient lies on the fracture table with both

legs videly abduct t The feet are bound to the traction fo t pieces of the table. The rope ends of the traction straps are han, ing free. Mu lin band, e and sheet wad d ng are plac d over the strap The knees are shel tiv flexed by means of overhead slings

------ CALLEGE.



Fig. 11 t fP sbdgd th peed the mbdt thm the lefth at dfi th t t bl ibythpll theotwh hsb tht t f tp fth ttl

To this procedure we then applied the principle of fixed traction the technique of which Dr H W Orr and I have recently published. The application of this principle to fractures of the neck of the femur is briefly reviewed as follows.

By fixed traction is meant traction which once applied is so secured by means of the plaster of Pari cast that it remains intact durin the p riod hat the cast is worn. Its application in this particular instance requires that the patient be placed on a fracture table that both legs be placed in the extension apparatu by bindin the feet firmly to the foot pieces of the table and be abducted to the degree necessary to bring about apposition of the parts Traction is then applied equally to the uninjured a well as the injured leg thereby bringing the pelvis d vn in correct position against the jel ic rest of the table. When full length and proper position are attained long moleskin traction traj which have rope end and extend well up on the thighs are applied to either side of both leg and held in position by musin and sheet waddin, band es The knees are fleved slightly by means of overhead retainin sings and a plaster of Paris double spice cast applied from the lower pelvis down to the ankle After the plaster has set the rope ends of the truction straps are turned back against the side of the leg casts. While forceful pull is made on the ropes plaster-of Paris sufficient to imbed them in the cast is applied. The traction is kept up during the procedure through the foot pieces to which the feet are bound. Therefore when the bandares are cut from the foot the fived traction straps will not permit the leg to slip back up into the cast.

Two boards one below the knees and behind the calves of the less and the other above the knees and over the quadrineeps region are imbed ded in the plaster cast. Sheet wadding, I applied to the feet and they are put up in plaster in the right and position if one is not certain that



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Fig 7 (left) Showin the completed en ts ith crobars in place
Fig 8 Tipping the casts al o tips the pel 1 The

triangle true upp rt uppled by the crobars insures the relative movement of all the component parts when one part i moved

proper exercise will be given to the fect to prevent their falling into an equinus deformit. How ever if the patient can afford adequate nursing care he derives great satisfaction from having his feet left out of the cast. Daily massage can be given and the patient can be encouraged in the use of the muscles of the leg and foot.

When the patient is moved to a bed the springs should be stiffened by cross boards under the mattress the foot of the bed should be elevated 8 or 10 inches and just sufficient weight should be televated to the lower cross board and placed over the end of the bed to accommodate the pull of the body against the cast. The amount varies of course with the weight of the pitient. In this position the patient can be turned on his face daily or propped up a little.

Even with this short cast about the pelvis many elderly patients with pendulous abdomens have objected strenuously to the restraint of the plaster about this region and have said that if they could only be propped up some of the time in bed and not have a tight band across their bowels they would be happier. Therefore after a week or so the anterior or abdominal portion of the pelvic part of the cast was removed letting the posterior part hold the legs in position. The patient was propped up with pillows or back rest care being taken that strenuous traction on the cross bars of the cast was kept up and the foot of the bed kept elevated. Roentgenograms have shown that no ill effects result from this modification of treatment.

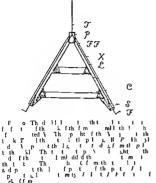
The success of this procedure led to the adoption in practically every case of the following technique. Two leg casts are applied in a widely abducted position both legs having fixed traction applied by the use of moleskin traction straps imbedded in the cast. One cross bar is placed above and one below the knees thereby equalizing the pull of one leg against the other and that of both legs against the bony pelvis.

The essential points in the application of the leg casts are exactly similar to those described in regard to the double spica. Considerable care should be taken to make sure that the leg casts come well up against the pubes and high up about the trochanteric prominences. The casts must fit well. There should be ample padding in the region of the pubes the trochanters and the knees. For this purpose, a light weight felt is preferable, but care should be taken that the padding is not too hervy.

The writer has endeavored to illustrate the principles involved by a series of lines forming an inverted I (Fig. 10). The angle at the junction of the I represents the pelvic girdle the upright line the trunk of the body. The two forks represent the lower extremities. A break appears in



Fig. 9. The patient had been in casts for 8 vecks. From the time the casts were applied she had been able to sit propped up with back re it as often as she wished. Durin, he stay at the hospital she did a cons derable amount reading and writing. The foot of the bed is elevated Traction is applied to the lower cross bar over the foot of



one of these lines just below the pelvi an le Along the course of these line a c rd i attache l and about them two cylinders are place I the upper end of each in contact vith the pel ic an le the lower coming well down to the ankle region Separating the e cylin lers are t o cros bars welded into the cylinders one up near the pelvic girdle and the other do n toward the ankle. The traction cord are attached to the extrem to line and are brought lown over the lover en l of the cylinder and turned back tightly a ainst it and then tied to the lower cross bars. At the unction of each one of these cross bars vith the evlinder a rigid trian le truss is formed. The cord attached to the extremity line and to the low cross bar hold the cylinder up in position a unst the pelvic an le and stabilize the extremity within the cylinder so that every turn hich the lody makes involves a rotary movement of every other part of the frame work from the pelvic girdle do n so that it is impossible to change the position of the broken extremity Thu one extremity is splinted a ainst the other and the truction on each is firmly fi. e l Here the engineering structional principle of a

series of triangle trusse is applied through the cross bars and pelvis The traction straps in addition to holling the traction stabilite the lover extremity in the casts Such procedure then applied to the human body has a greater stabilization than shown in the

tion in that about the fractured neck of the femur are the heavy muscles of the hip joint which and greatly in the stabilizing of the framents In addition to the procedure for the past year or

so we have uniformly impacted with gratifyin results every fracture of the neck after the method lescribed by Dr. Fred T. Cotton. More recently the writer has use l a concave block fitting over the trochanteric prominence a_ainst Hous of the mallet may be more accurately aimed The impaction ad Is much to the security f these ca es and seem to help brin, about their successful termination. Llder v. fleshy patients t lerate this methed of fixation better than any ther as it enables them to have far more freedom than can be all me lat the trunk is covered with a cast or than can be hall by Buck's extension

Thomas splints or other traction apparatus. The method involves the use of a traction talle which is not a part of the operating room equipment of every tirst class hospital At first I used the method rather dubiously but constant checking by \ray examination lemonstrate I the relial ility of the procedure so

that now I allow these patients almost unlimited free lom in bed provided tract on is kept up on the lower cross bar o er the end of the be I to take care of any unusual jerks or sulden change in nositi n that may occur during the first week or so of treatment \ery ften in spite of strict or lers I have f un I patients sitting bolt upright

ith ut even a hack rest shaving or combing their hair or lving on me i le half way out of bed I have often su nected a los of position but Year examination has all are shown the fra

ment to b in c rr ct alignment

After 8 or 10 weeks the casts are removed and al no all fitting ring caliper splint i applied This i worn for a m nth The patient i al loved to u e a wheel chair During this time massage a lacti e and passive motion are en c urage I daily. At the end of 12 weeks the pa tient i all sel to alk with crutches we h on the fra tured leg 1 carried throu h the ring again t the ischium. If the \ ray examina tion is sati fact ry afte 6 month the patient max valk tha cane and crutch until at the end of o month to a year all apparatus and support may be li car le l

A sufficient numbe of uses have no been treated ucce fully by trian le truss supported leg asts to jut fy a preliminary report of the techniq e I ha e found that the method ald much to the comfort and well being of my pat ents and so far the procedure seems to be thoroughly tisfactory

A NEW PROCIDURI IN THE DIAGNOSIS OF URITERAL CALCULI

BY I MITH I DOUR MASHKIN MID NIW YOR

SINCI the advent of \ray and evistoscopie methods of dragnosis of ureteril stones the correct interpretation of \ray shadows lying in the course of the ureteril tract has presented many difficulties. The extraneous shadows hing side by side with the ureter may frequently exhibit typical signs of a ureteral calculus so as to confus the most experienced observer. In error is especially possible when the symptoms point to a lesson in the urinary tract on the side on which the shadow was noted.

Twenty six years ago Kohscher and Schmidt (3) suggested the us of a shadowgraph catheter



In. 1 Fitta uncteral shadow having all the typical marks of a unterial calculus. The patient was a young man grung a history of severe attricks of renal cole on the sam sile. The shador resembled astone so closely that the patient was all used on the strength of N cap findings to have an operation. The evtra uncteral origin of the shadow is fourses self evident (double ureter being evcluded by cystoscopic variantion). In ever if this shadow had tee in closer provimity to the ureter an error in darnosis might very easily have been made. Note the dilatation of the ureter can the which is most probably the result of a stricture below.

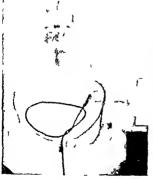
in order to determine the relationship which may exist between the lumen of the ureter and suspicious shidows. This simple procedure renature up to this due the most reliable method by means of which most of the shidows of extra ureteral origin may be so determined by inding them at some distance from the course of the optique cutheter. A possible error which probably was not pointed out before may be due to the failure



If y lypelo uretero ram illu t atm the reason for the failure to el cit scratche marks on was bulbs pass dinto ureter contaming a store. The upper arrow indicates the filling, defect produced by a mail ure acust stone floating the dated portion of the ureter. On the plant case, film the position of the ureter. On the plant case, film the position of the film defect was marked by a faint shadow separated from course of the opaque catheter by centimeter. The low rear or indicate the filling defect produced by the way tip of a shado raph catheter which is as dra in lown in the the opaque solution was in jected. This ca e demonst ates how a way bulb may pass by the stone without feltching an actual contact with it



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on the part of the cystoscopist to recogn touble ureter on the "facted side. When a wigraph catheter in such a case is passed in ureter not containing the stone it he other uit some distance from the course of the oratheter may lend one to an erroneous cond. That the condition is not so ver, rare may be must from the fact that the author found informaties in a series of 355 cases of stone in the cut of the oratheter (i). Another error may be due to a flasting in the dilated portion of ureter in case its shadow may be seen to be separated the course of the opaque catheter (Fig. 2).

The use of the opique catheter however ne diagnostic value when the sha low in que is found in close proximity to the catheter similar picture may be produced by an extrashadow incidentally in juxtaposition with ureter Ordinarily in the presence of impa i e have sufficient cystoscopic evidence poi to calculous obstruction. In such cases the nosis based on eystoscopic findings and cor rated by an \ ray showin the opaque cat either just below or in close contact with shadow in question is easy. It is in non impa cases in which the cystoscope very freque fails to show any evidence of trouble that co interpretation of \ ray shadows is essential use of the way tip catheters at least in our ex ence has been entirely unreliable in that it



It 6 Case 1 A shado (arrow) placed in close protunity with an opaque catheter 7 centimeters abo e the blad let. The patient was a young man whom I saw in September 1926 and who 12 e a history of repeated at tacks of renal cole on the right side. Systoscopy re calculations hed renal function and moderate amount of retinon on the ame side. Whigh tol struction was encountered at 7 centimeters with a No. 8 Charnere was tip catheter which was ne attive for a scratch mark. A diagnoss of ureterial calculation was made.

frequently fails to elicit scratch marks. It is indeed very surprising how a wax up catheter may slip by a stone or push its way up and yet escape without the slightest indication of any scratch mark. This may be due in a great measure to the comparative smoothness of movable stones to a film of slimy mucus covering the calculus or to the passing of the wax bulb into a dilated ureter without effecting an actual contact with the stone

The double exposure from different angles a method used by Kretschmer (4) since 1918 has been of great value in determining the status of suspicious shadows in some cases. It is however not always successful as the questionable shadow may remain in the ureteral line on both exposures (Fig. 11). Furthermore the shadows frequently become so blurred that the correct interpretation of the roentgenogram is impossible. Faint shad ows are often not duplicated and are difficult of recognition in pictures taken of stout patients.

Bransford Lewis (5) in 1922 described an in genious method whereby true stone shadows



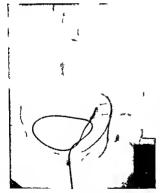
Its 7 Case t Thr e months latter. The night urefer vas gradually dilated until 3 cath ter (Nos 3 6 and Chartere) coul 1 be introdu ed easily. Note that the shad ow (arrow) is still in the same place. The prutent no longer complained of attack. Of renal colle

could be differentiated from those cast by phleb oliths or calcified glands By using his rigid dilator he caused the ureter to be strughtened out thus separating it from an extraneous shadow which was previously noted to be in close contact with a flexible catheter. This method however entails the passage of a rigid instrument beyond the level of a shadow in question which may not always be done and is of doubtful value higher up where the course of the ureter is fairly straight.

Recently Ziegler (8) suggested the use of a double exposure roentgenogram on an empty, and distended bladder. If the shadow is that of a stone it will be doubled because of the elevation of the lower ureteral segments by the distincted bladder while the shadows of extra ureteral origin will remain single. Joseph in his recent use to the United States showed some interest ring films illustrating this method. Such a procedure however is of value only in cases in which the shadow is seen in the region of the juxta vesscal portion of the ureter. Furthermore the



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If s At hdo (w) icl p mty that fatad bbbg the the bgw lil the ple ligdeth to e Note that the lit the d fathebgict that

on the part of the cystoscopist to reco mare a double ureter on the affected side. When a shad ongraph catheter in such a case is passed into the ureter not continuing the stone the finding of the shadow (produced by a stone in the other ureter) at some distance from the course of the opaque cutheter may lead one to an erioneous conclusion. That the condition is not so very rare may be sur mised from the fact that the author found z such anomalies in a senes of 355 cases of stone in the ureter (1). Another error may be due to a stone loading in the dilated portion of ureter in which case its shadow may be seen to be eparated from the course of the opaque catheter (fig. 2).

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Fig. 8.C. Fm th]tr]h Jad by the till the pl N 4.Ft lldbug tt p tby The the till the the opq sa f llngh pl th wp p ten tf mth hd w a t

picture is very often blurred esi ecially in stout patients and in se eral instain es of politive ure teral stone shadow. I have failed to [roduce its reduplication

The stereos pic N riv examination while of great value in certain types of cases will quotin such an authority as I Seth Hirsch aften ail to show the true relationship of N rav shadows I wing along the of the ureteral tract to the lumen of the ureter. The stereoscopic apparatus hirs in the sevent become part and parted of the ureto ical equipment and in its absence one must resort to other methods of dia noisy.

The interest of opaque solution into the ureter is some hadow i faint or the solution is highly oncentrated it produces no contrict between the shadow as the three calculus and that produced by the opaque solution with the ception of the non-opaque une acid stones which may be beautifully demonstrated by a filling defect. Steens (7) as the first it describe this procedure in 1917 and in the author's experience it has proved of immenses, also in clearing up some doubtful cress.

I of i on thist The pt to mplet depth of ill ympth bepin to the state of the state

Pecently the author has resorted to a new pro cedure which it is believed offers an accurate salu tion to the problem. This method depend upon the property of the rubber big catheter when introduced into the ureter and inflated to expand not only laterally but in a longitudinal dir ction as well as has been hown by the author e pen mentally on cadaver and clinically in a large senes of cases (2) The type of the rubber ba used is that which is attached to the catheter only at the proximal end (Fig. 14). The bag when introduced to a point even several centimeter below the calculu will continue to expand until the stone is reached (Figs , and 4) If the stone 1 Impacted the longitudinal expansion vall stop short (Fig 3) If the stone is movable it will as a rule be pushed up by the inflated by sometimes for a distance of 4 or 5 centimeter (Fig 4) The was demonstrated chinically in numerous in tances. In all cases the resulting bago ram will show the stone ab e the inflated bag unless the bag was ditended when placed deliberately alon side of the stone in which case



Fi to Case 2 Ashrow (arrow) and econtact the paque catheter in left ureter in a voman gain a history is epecial datasks off firenal color (\(\cup \); \(\cup \); \(\cup \); \(\cup \) if the sided hydroughpro 1 lecidedly liming the dread function and low grade colon leadlise infection. There was no bit trettion to a No 9 Charrier was 1 top criticate which was negative for scratch marks.





In Same as (a e z A rub) or bag wa introduced that intitled the halo v (arron) and roentgeno ram tiken I fore inflation

definite indentation will be produced on the side of the bag in contact with the calculus (Fig. 5)

1 rubber big introduced below the shadow in question pre-tously noted alongside of an ordinary opaque catheter will produce when inflated with an opaque solutian a shado i which will be superim posed upan and cause the complete disappearance of any shadow of extra urcteral origin while that of a true stone will be seen above the bagogram. As for as I know this method permits of no source of error except in those rare cases in which the stone is lodged in a ureteral diverticulum as in the case of Mcl'arland (6) It may be argued on a theo retient basis that a stone in the urefer may be lodged behind or in front of an inflated bag and its shadow be swallowed by that of a rubber bag I ractically this is impossible because in our tech nique the bag is always introduced to a point belo (Fig. 12) the stone and its position verified by \ ray before inflation When a bag is inflated with in the urcter longitudinal expansion takes place only after the ureteral wall is stretched laterally to a point within a certain degree of distensibility. This again has been shown experimentally on human cadavers and ureters of oven Before the bag has reached the stone the lumen of the ureter is filled up so completely with the inflated bag that any



Fg 3 5 m C. Thrulb † g flid h pi t t Thin d t the p t i t t thet the the bowh h p t extend h p t h b s the the p t i t x t d h b t m b d p t l d b b t t flit d b b g th l w g t t t l H d th b t t h d w t w l d h b n t d b t b b b g th

possibility of the drop ping of the stone behind in front or on the side of it is evcluded. Occa sionally, a fragment of the extraneous shados may still be seen alon side the bago ram because of the failure of the ureter to expand sufficiently in a lateral direction to cover it. The extra

Fig. 4 Mn flat decued th mok hh
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ureteral nature of such a shadow may of course be readily understood

To avoid repetition the case reports are condensed into legends accompanying the illustrations which the writer believes will cover all the points which have been suggested

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BILATERAL DOUBLE PILVIS AND UREIER WITH ANOMALOUS OPENING OF THE SUPERIOR LEFT URETER INTO I'HI URETHRA

CONCENITAL URITERAL INCONTINENCE

BY ROBERTO MISSANDKI MID I ACS (How) FRCS (FAC HOW) ROME ITALA

Along ureteral abnormalities one although not of very frequent occurrence is more important than duplication or bifurcation. This condition is easily recognized hecruse of its peculiarities. By this I mean the anomalous opening of one ureter out of the bladder sphincter and the resultant continuous dribbling of urine. We have called this special type of incontinence congenital ureteral incontinence. Its typical clinical feature is that although the bladder can be normally voided the patient complians that since birth he has continually lost urine.

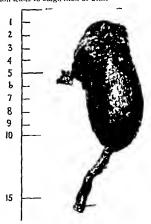
These cases are not frequent or perhaps it would be more correct to say that such cases have not been frequently recognized at examination. In many of the cases a diagnosis has been made of true vesical incontinence. I must add however that not every ureter which discharges urine outside of the bladder gives rise to the

clinical picture already mentioned

According to kelly and Burnam ureters have also been observed which end in a blind sac or open into the bowel (rectum and cloaca intestine urachus or amniotic cavity). However I wish to discuss only the cases of anomalous ureters which discharge in the male into the posterior urethriseminal vesicle ejaculatory duct ductus deferens and prostatie vesicle and in the female into the urethra vagina vulva Gaertner's canal uterus

and fallopian tubes I shall only mention the anomalous openings into the bladder because these never give rise to involuntary loss of urine There is also lack of incontinence in the already mentioned abnor malities in the male because the openings are generally situated above the colliculus so that the external sphincter is able to maintain bladder continence In the female incontinence is not present if the anomalous ureter discharges into the uterus tubes or Gaertner's duct However it is typical when the opening is in the vulva urethra or vagina Therefore I would state that only when the ureter discharges into the urethra or vagina does the clinical picture of incontinence exist The patient since birth has had a con tinuous involuntary loss of urine while at the same time the bladder function has been quite normal These two apparently contradictory conditions seem to indicate the presence of an inomalous ureteral opening. It will not usually be difficult to discover such an opening if a careful examination is made. The discharge of urine office occurring with ureteric rhythm is our principal guide.

The real importance of such an abnormality lies in the great inconvenience which it cruses. When incontinence is not present the abnormality is not recognizable and if inflammatory complications do not supervene it has no c inical importance. The majority of this abnormal cases remain unnoticed as is also true in eases of bifurcation or double ureters when no pathological condition exists. Infections and calculus complications occur frequently in these anomalous urinary systems because the congenital malformation leads to stagnitude of urine.



It s Superior half of kidney excise l





3 Litpy!

In the case which I wilh the pre ent there was an anomalous orthce in the ur thra fone 1 the left n eters (the upper one is it il is hall n) and als a duplication fith right wrete and i bilateral double pelvis. Such an an maly i exceedingly rare and I think the ca e is well with reporting Lecaule as far as I know radical operati n (heminephrectomy) has never lefore. l een i erformed in such a ease

Viotal f o cases of ectopic ureteral co nines ha e been reported in the literature with 50 cases t lilat ral ureteral luplication. Kill and in a very careful taper clas ifies the abovemulity in lifferent types (1) one ureter with an ect pic

itice () duplex ureter of one side with an e t pic pening of the supernumera, ne (3) lilit il urcteral duplication with ectopic ci en ing (4) distriction of one side with d uble kidney in l pelvis and with an ectopic openin of the sur rnumerary ureter (5) bilat rul double ureter and pel is with one ectopic openin (6)

liliteral I alle areter and pelvis with bilateral et it penin s and (7) single normal ureters en h di charcin, out of the llidder

These ndtyle smost common MA coli who I is fully rejected my case has added ther cases t th segati cred by Kill and 1 e 1 to the 4 of the trst type and o to the 55 of the second To tle 64 cases of the second type I mu t now add two other cases I ublished more recently by Gau ham and Puccinelli Kilbane reports only 14 cases of the fifth type. Mine would be the ff teenth case T elve autopsy reports are gi en and I has been ob erved by Madelung in a girl of 14 years who had a supernumerary left ureter open in, mto the vagina no operation was performed

Only one case that of Al berg has been oper ated upon Thus ratient was an 18 year old girl with a upernumerary right ureter discharging into the anterior wall of the va ina Alslerg thought that there was a vesical fistulous openin and tried to extirpate the sinus which went in the direction of the right parametrium. The patient died from pyamia at autopsy it was found that the sinus went to the right pelvis. This case must be considered as having a supernumerary ureter even at the left there was ureteral duplic it in

Becaus of the rarity of my case in lat sur gical interest I will report its clinical his tary

Mis Aurelia T 14 years of age ent 1 il 1 gil complaining of a continuous incontinen e of i has been present day and night sinc toril II II II II function however is normal and 4 to 6 tim tationt columnarily voids the bludder Sl 1 this impulse at night. Family anteced his and t history are not significant

The patient's general con in n Framination No co L II I I formations are to be noted. The thorn and I i The skin of the labia majora and the inter al face of the thighs on their superior thir I ha un! i n At regular inter al ulm t itl a process of dermatiti uretene rhythm the urethral mentus open and a ir p i urine comes out Vesical catheterizing as a v 100 ul ic

Cystoscopy The bladder is normal and wh n it i the l with 250 cubic centimeters of water the patient i i in intense stimulus to void but if told to hold the rin h essily obeys On the right side to o urete ic ornic b seen one is in the normal site the otler i more medially situated near the internal urethril 1 On the left side only one ureter is in the normal ie \l

three openings look quite normal bresh oscop). On the posterior urethral vall ery n ar to the external meatus an onice lookin 1k au trl openin is seen. It looks a little smaller it hips ar r lli h and move rhythmically. Indisocarmine gi n it a e nously returns after 3 minutes from the en love ic 1 op n No elimination from the extravesical ornic i roted Two No 6 French catheters pass freely into both ruht pelves A pyclogram shows two norm I pel Ih ureters cross each other according to the Wei ert Meyer

law (l'1 2) catheter is easily passed into the left vesical ureter up to the pelvis I rom the extravesical openin,, it is impossible to push it more than 20 centimeter A pyclorram sho s that on this side also there are two pelves and that the ureters cross each other. The inferior pel is corresponding to the bladder opening looks quite normal while the superior one which I drained through the ectopic ureter is

much dilated (Fig. 3)

Ob ration A catheter is passed before the operation into the left normal ureter Lumbar incision 1 made as the kidney is very highly placed a resection of the anterior two thirds of the twelfth rib is added. The kidney looks larger than normal It is composed of t vo parts separated by a groove especially evident on the anterior surface The superior part which represents only one third of the wlote kidney is composed of a thin layer of kidney substance and by a pelvis as bie as a turkey egg druned by a thick and diated ureter the inferior part has a normal pelvis and ureter and in this the catheter can be felt. Each section has its own vessels. Those corresponding to the supernor portion are very thing. These are I gated and sectioned The ureter is severed as low as possible that is to say about a niche above. 2 inches above the bladder and its inferior stump is tied and burned with a cautery. The two kidney hal es are separated with a cuneus like incis on in the inferior one With deep hamostat c mattress stitches and superficial capsular stitche the raw surfaces are brought

together The fbrous capsule is stripped away from the removed kidney portion and fixed with a few catgut stitches on the kidney stump o as to coat it liter reposition of the kilnes the cound is closed with a rubber drain left near the kidney stump. The drain in this case was remove lafter 3 days I ecovery was uneventful and there wa no discharg from the wound Incontinence disap ared at once

In reporting the case on which I operated I um above all to draw attention to the canical syndrome of consental ps udo incontinence and to the possibility of establishing a diagnosis an I of letermining the anatomical conditions. It is essented to determine the number of the ureters and the anatomical and functional conditions of the pelvis and kidneys Cystoscopy ureteral cithetenzation pyelography indigocarmine and pthalem test blood examination and sometimes penrenal ansafflation of oxygen should be em ploved

The involuntary loss of urine also is sufficient in itself to justify operating even if no complica tions are pre nt However as a general rule the pelvis which corresponds to the anomalous ureter is dilated and intected and the ureter is often found diluted and irregularly shaped (uretero uronephrosis or uropy onephrosis)

The following types of operations can be used Simple ligature or s ction of the anomalous ureter This is undoubtedly the simplest operation and is reported to be sometimes successful However it absolutely must not be used when infection is pres nt in the corresponding pelvis I would never employ this method myself be cause it leaves behind a portion of ureter and the pelvis as a blind dilated sac which even in the best conditions is subject to infection because of stagnation of urine

2 An istomosis of the ectopic and norma ureters This is often a technically difficult opera tion and a dangerous one because of the possibil

ity of ascending infection

3 Anastomosis of the two pelves This opera tion is also a difficult and sometimes impossible one It ought always to be completed with th ligature of the supernumerary ureter or muc better with a high section near the pelvis

The formation of a ureterovesical fistula This can be done through the ureter by means of endoscopic instruments or by opening th bladder by the suprapubic route Such an opera tion 1 generally very easily accomplished because for a certain length the ureter is adherent to c is embodied in the bladder wall. Regarding th first of these methods I think that used by Hur ner is the lest. Into the anoma ous ureter h pass d a catheter the tip of which was coate

W

with a rubber glove finger which could be inflated In this way the ureter could be made to bulge into the bladder so that a communication was easily established. The ame thing can be done even more easily through a suprapulue cystotomy as in Tauffer and Baum's cases

5 The severing of the lower portion of the anomalous ureter followed by implantation of the superior stump into the bladder (neostomy) This has been done by the subpubic route with good results. Many times the va inal or suprapubic route has been used but has seldom been In Lieris case an implantation through the vagina was followed by an ascending infection which at last led to a nephroctomy must also add that in the cases reported as cured often after several operations frequently a ste nosis of the new opening has been obserted

6 Pemoval of the anomalous structure Al though a complete cure can be obtained with any one of the already mentioned operations I be here that removal of the inomalous structure is surgically preferable. Naturally if only one ureter with an ectopic opening and one pel as are pres nt great care must be taken. I lelieve that in such cas s the formation of a vesico ureteral fistula 1 more strongly indicated. When a severe infection is present a nephreetomy may be per formed if the other kidney functions normally In cases of double urete and pelvis the opera tion of choice is heminephrectomy

Total nephrectomy which has occasionally been done is certainly a much simpler of eration but it is recommended only in cases of severe in fection of the sur ernumerary pelvis with diffusi n to the kidney substance or in the pr sence of a unique pe licle

If as it usually happens in addition to a double pelvis there is a double vessel pedicle and the two kilner halves are separated (very often as in my case there is an evident grove) a heminephrectomy is preferable. The superior ortion is usually the one to be removed because according to the Wei ert Meyer law the lower ureteral opening will drain the superior kidney half M Ascoli who has widely searched the litera ture has found this operation reported only 10 times My case is the eleventh and the first one of biliteral duplication with an ectopic openin Even in Gaudiani s more recently published case heminephre tomy was performed. The number of op rations therefore is 12 and in all of these the result has been good

is to technique I wish to draw attention to the way in which I separated the fused kidney into its two halves corresponding to the already mentioned groove A wedge incision was made in the inferior healthy portion which was to remain in place so that it was very easy to bring together the two raw surfaces of renal substance and to suture the fibrous capsule tightly (Kuemmel) I think that it is also very ad an tageous to coat the sutured kidney stump with the capsule stripped away from the excised kidney portion The suture so covered assures a better hæmostasis and prote tion against an eventual filtration of urine

BIBLIOGR APHY

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UTURING STERILIZATION

BY WHITIM ON HIT SHITMAN MD TACS PITTSBURGH

N an address on Sterilization of Wounds the Treatment of Suppurating Wounds and Oste omyclitis (Carrel Vethod) delivered by the author before the Royal Society of Nichane, in London October 31 1916 (4) attention was called to the possibilities of treatment of infection of the

uterus by the Carrel method

A visit to the clinics of Carrel and Delane in July 1916 gave the impression and conviction that the problems of wound infection had been satisfactorily solved. A rational debridement of wounds within 8 or 10 hours after the receipt of the patient followed by chemical sterilization with sodium hypochlorite (Dakin's solution) with primary or secondary closure resulted in union in a majority of cases so treated. The results of the Carrel Dakin treatment when compared with thos of other procedures make it the method of choice especially by those who have had the opportunity and have given the time to study and master its technical details. Its general adoption has been greatly retarded because of superficial observations and scanty consideration of the basic principles involved by visitors to the Carrel and DePage clinics without a distinct under standing of the underlying surgical chemical pathological and bacteriological principles

The great lack of understanding and the failure to carry out details as well as the modification by surgeons who do not understand the method are the chief cruses today of the general misunder standing and the great divergence of opinion as to the ments of sterilization of wounds with sodium

hypochlorite

The great similarity between wounds of war and uterine infection give rise to the hope that if a satisfactory technique could be devised progress would be made in the treatment of uterine infection. Wounds produced by shells which in troduce into the tissues foreign bodies contain nated with soil pollutions together with the tatuma of the soft parts present very much the same picture as the postpartum or postabortum uterus with its retained secundines proliferated mucosa and blood clot together with the exposure of the raw surface of the uterus at the placental site.

In the great majority of cases uterine infection at its onset may be considered as local or super initial while involvement of the parametrium broad ligaments peritoneum and blood stream is a later and secondary extension. It would appear logical to assume that if effective treatment were directed before such extension of the infectious process arrest or even suppression of the infection can be secured.

The author early recognized the great possibilities of sodium hypochlorite in the treatment of localized infections such as uterine sepsis and in the aforementioned paper briefly advocated a technique whereby it would be possible to apply the Carrel principle to the treatment of uterine infection

With this in mind, the author devised a special armimentarium consisting of ulcanized cervical pessaries perforated rubber tubing introducer uterine sound, and packer. A brief description of the apparatus was given in this earlier publication (1)

The principle of the treatment consists in the gentle introduction of the pessary into the cervix followed by the introduction of rubber tubes through the pessary into the uterine cavity and the packing of the uterus lightly with bandage gauze so that the tubes are retained in position against the walls of the fundus. They give the appearance of the steel ribs of an open umbrella The gauze acts as a sponge and gives off to the uterine walls the hypochlorite solution as it is ejected from the rubber tubes. Should it be deemed advisable to remove some of the retained s cundines this may be done in the early cases provided great caution is observed not to trauma tize the mucosa by curettage or instrumentation It is more conservative to use a small cotton sponge on a holder and by this means excessive debris can be gently and sufficiently removed Curettage absolutely fails to remove all of the in fected tissues and usually is provocative of great harm by setting up active extension of the infection For this reason curettage is generally in advisable

In this paper I do not wish to discuss the many frictors entering into the cause and prevention of uterine sepsis but rather to direct attention to the great similarity in the pathology of uterine in fection and that of general surgery with the hope that the principles and methods used in the latter field to combat infection will be applied to related obstetrical problems

One great difficulty in the treatment suggested is the frequent inability to retain the tubes within



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the uterus when contraction begins. The tend ency is for the tubes to be forced into the vagina ency is for the tubes to be forced into the vagina applicable only in early selected cases and in hospitals where every possible facility is available to carry out each detail of the method. Because of the dangerous extension of infection following ill advised or anything but the gentlest of manipulations this treatment should be attempted only by those who have specialized in this work, and who ha e made a careful study of the principles involved.

It is quite true that many patients with puer peral infections are frequently seen only in the late stages when acti e intervention is contra indicated Therefore it is imperative that phy sicians nurses midwives and the lasty be edu cated to the necessity of active treatment at the earliest possible moment so that immediate steps can be taken to abort or suppress local infection hefore it be omes general or systemic Cases in which unnecessary and careless examinations or intensive instrumentation have been made and in which infection is probable should be treated prophylactically immediately following delivery and before signs of local intection become appar ent It must not be forgotten that in the ful minating types blood stream infection and death occur before local symptoms are evident and be fore any measures can be instituted

It is conceded that there are causes for py term in the puerperium other than infections of the uterus. If the temperature rises to too or for degrees F pulse increasing from 105 to 110 together with the presence of bacteria on smear and cuture taken from within the uterus treat ment should be started at once. The diagnosis of uterine infection should be made only by a process of elimination after every other possible factor such as focal infection pulmonary or ab dominal disturbance massitis plebits cystis.

etc has been ev luded. To delay and hestate in an effort to differentiate between sapræma and a true uterine infection is likely for result fatalli. It is usually impossible to differentiate in the early stages between them and it is generally admitted that a sapræma frequently merges into septicema.

There is no doubt but that the indi criminate use of antiseptic intra uterine douches has produced much harm and has been of no benefit in the treatment of uterine infection. It is obvious that the best treatment is prevention. Despite exacting precautions and the very best of surroundin is however infections not infrequently occur. Too often are the attending doctors and nurses consured when every care has been taken and blame is unwarranted. On the other hand there are many cases of infection due to repeated examinations faulty technique and instituty surrounding, all of which is more or les within the control of the physician or nurse.

The question of puerperal infection is a senous one and demands the attention of the profession as there has been hittle or no reduction in uterine sepsis and mortality during the past 30 years Whitchouse indicates little change from r883 to 1002 and from rot 10 10 2 in mortality.

GENERAL PRINCIPLES OF THE TREATMENT OF PULRPERAL SEPSIS

The most generally accepted plan is that of watchild waiting a sagainst direct intervention. Active treatment (curettage or intra uterate douching with useless antiseptics—mercury salt sodine the phenol group salver salts) has resulted in absolute failure to cure and such treatment is more likely to be the cause of a dissemination of the infection.

During and previous to the war the general failure of all antiseptics other than sodium hypochlorite to abort or cure infections resulted in the division of the profession into two groups those who had futh in antiseptics as inhibitors or destrovers of infection and those who believed in the physiological treatment of wounds and in fection by saline arrigation and aseptic technique. Notwithstanding the fact that functure of iodine solutions of mercury salts and the phenol groups failed absolutely to combat infection during the World War thus resulting in a great less of life and frightful disabilities there are those today who doggedly continue to treat infected wounds in the blind faith that these uscless so-called anti-septies are specifies.

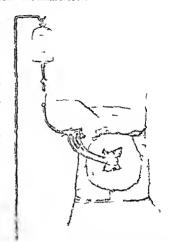
The present general status of the expectant method is largely dependent upon the vital leaves of the patient i.e. if there is sufficient resistance to overcome the infection recovery is possible the patient receiving very little in the wir of medical assistance. About the only active treatment is the use of ergot elevation of the patient for dranage, ice to the abdomen rest avoid meeting the patient of catharties and such measures.

LOCAL TREATMENT AND TECHNIQUE

No attempt will be made to discuss in this piper other therapeutic measures of admitted value but attention in the early stages is to be directed toward methods of sterilization of the uterine cavity.

The patient is anæsthetized preferably with ethylene or nitrous oxide and placed in the lithot omy position. The external genitals are cleansed with soap and water in the usual manner and vaginal irrigation with 1/0 of 1 per cent solution of sodium hypochlorite is given. Piene acid iodine peroxide ether or alcohol are not to be used as they are incompatible with sodium hypochlorite. Careful inspection of the vagina and cervix should be made followed by a gentle bimanual examination to determine the size and position of the uterus.

The cervix is grasped with a single tenaculum and with the blunt uterine sound of the nuthor's design the distance between the fundus and external os is measured as well as that between the internal and external os. Subtraction of the difference between the length of the cervix and the measurement from the external os to the fundus gives the distance within the uterus that the perforated rubber tubes can be introduced. For purposes of safety and to prevent any possibility of perforating the fundus with the metallic intraduction formoule to a centimeters should be made. This will allow ample distance for the placement of the tubes within the uterus without perforating the fundus within the uterus without perforating the fundus.

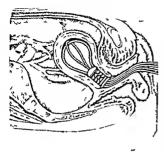


11 2 Vaseline gauze dressing applied to pe incum prec at artitution. Rubber tubes attached to Carrel gladistributor and container solution is introduced intenuterative and not by the drop method.

At the same time the width of the cervical can should be carefully estimated so that a pessamat be selected which will be small enough pass without the slightest dilatation or oth traumatic force

The perforated rubber tubes are then placed: a supporer sized pessive a sufficient number of a free outflow of the hypochlorite solution from the tubes over the entire surface from the extension to the fundus. When the tubes are threade into the pessary sufficient length must be left in that their ends will reach to the vaginal outlet.

The introducer is then placed in the centropening of the pessary, where it grasps and lock the distal ends of the perforated tuber. After has been determined how far the tubes are to be introduced within the uterus a set screw on the handle of the introducer is adjusted, and the rubber pessary is carried into the cervix, the tubes are passed up into the carly of the uterus until the introducer engages with the set series. The introducer is then released from the perforated tube and withdrawn from the pessary. The tubes are



left placed within the uterus and the 1 essarv in situ within the cervical canal

The pessary presents its outer surface at the external os. Through the central epening if the pessary brinding gauze is preced lightly into the uterine eavity in such a mininer and quantit that the car it is entirely filled with you is the lower end of the bandage limit ree in the vigina. The tubes are thus held in josti in against the fundus and walls of the uterus the gauze serving as a sponge which constantly holds and gives off the sodium hypochlorite to the ut rine walls

A small projecting shelf at the onice of the bestarn permits if desired the fixition of a rub ber dam co er which encases the tubes and drain age gauze so that the vagina is protected against any possible irritation from the hypochlorites. This step complicates the general technique and is not essential. In the presence of a vaginal teri with ulceration or infection such protection might even be undesirable and extravaginal tubes may be placed as indicated.

If must be remembered that the object of utering squares is to act as a sponge and if packe! in tightly it will take up too httle of the solution in suspension. The special packer designed by the author is used to introduce the gruze into the uterus. The skin of the external genulals sprotected by aseline strips of gauze and a large absorbent pad of cotton and gauze. The irrea absorbent pade of cotton and gauze. The irrea too tubes placed within the uterus and presenting

at the vulva are attached to a glass distributor which in turn is connected with a large rubber tubing from the container holding the hypochlo rate sofution This container is elevated a feet above the head of the patient and the solution is allowed to flow from the container when a stop cock is released scepage of the hypochlorite solu tion is observed at the valinal outlet. At inter vals of every hour in day time and every 2 hours during the night from 4 to 8 ounces should be instilled The solution mu t be injected under pressure 1 ut not enough pressure should be used to force the solution through the fallonian tubes into the alkdominal cavity nor should the solution le instilled by the drop method as is saline in the Mun hy drap

S hum hypochlorite houghes the retained sec undines an I bacteria by a pricess of oxidation and imple outflow is remitted through many Iraina,e holes in the cuff of the pessary. As the uterus recovers its tone and contracts we must expect difficulty in retaining the tubes in situ The bandage cause in the uterus may be chan ed every lay but the tules and pessary need not be chan ed oftener than every second or third day As the uterus involutes smaller pessaries must be used If the tem; erature and pul e fail to show marked improvement within 5 to 7 days treat ment shoul I te disc ntinued and failure admit ted There will usually be quite a visible change for the better 11hin 3 or 4 days provided the treatment is started while infection is still localized s ithin the interus

The cer and passaries are made in 4 sizes with different sets of introducers and 2 sizes of rub ter tubing. It must be understood that extreme gentleness mu t be evere ed at all times and trauma all solutely a outed.

CHLMICAL PHASIOLOGICAL AND BACTERIOLOGICAL
IROPERTIES OF SODIUM HAPOCHLORITE

The soi ent and anti epite properties of Javelle water and Libarraque s s lution were long kao n I ut th y were too caustic to permit of their sur giral use while the ineffecti eness of iodine mer curs silves ralls and the phen I group ha e I een diseases delse where in this paper. It remained for bakin and Daufresne to desise a method of utth ing sodium by pochlorite of kno in content in so far as its percentage of odium hypochlorite was oncerned and of relitively low alkalimits.

By the use of 5 per cent active chlorine (bleach ing lime) with the addition of sodium bicarbonate a solution of constant hypochlorite content (45 to 5) known as Dikin s solution was accepted as a standard for surgical use. The phenolphthalein test of the alkalinity is not a reliable chemical test as to causticity and can be only a relative in dicator. The hydrogen ion content is generally accepted as the most reliable index of ikalinity A 45 to 5 sodium hypochlorite solution as made from bleaching lime has proved to be an excellent solution when used in connection with the Carriet technique. It requires however constant testing because of its instability. It is rather difficult to make or secure a reliable Dakin as solution in the vast majority of hospitals. The hypochlorite solution of greatest stability and lowest ilkalinity when combined with sodium chloride makes an almost ideal antisciptic solution because of its bactericidal and physiological properties.

The great superiority of sodium hypochlorite over other antiseptics is due not only to its inti septic properties in destroying bricteria but also to its property of dissolving necrotic tissue \(\lambda\) 4 per cent solution of sodium hypochlorite will destroy anthrax and its spores immediately a dilution of I to will destroy inthrax broulli and

spores in 15 minutes

What is the chemical action of sodium hypochlorite when it comes in contact with bacteria or with dead tissue? The chlorine of the aqueous hypochlorite has great affinity for the introgen of the proteins setting free insecret chlorine and forming a chloramine. The affinity is so great that the hypochlorite is practically used up within 5 to 10 minutes after its injection into the wound this being the reason why repeated injections at such frequent intervals are so necessary. Sodium hypochlorite in proper dilution is non toxic and can be used in any quantity. The author has used 10 000 cubic centimeters during a period of

4 hours in the treatment of empyema with no deleterious effect. It has little or no destructive effect on living tissues in proper dilution but seems to have a selective action for bucteria and dead tissues and is the only great oxidizer at the present time available which can be used freely without danger of injuring or destroying living

tissues

The ideal solution to be used is one that is isotome combination of Dakin's solution with low alkalimity and saline content sodium hypochlotite 5 per cent sodium chloride 7 per cent

and aquæ distillæ 98 8 per cent

Chemical sterilization of the surface of living tissue is but a relative term in ereduction of it to a bacteria to 5 microscopical fields this average being made from an examination of 20 or more fields. The few remaining bacteria which have not been destroyed by the hypochlorite can be well cared for by the phagocytes and leucocytes.

If sodium hypochlorite can sterilize large em pyema crivites compound fractures and joints it is not too much to expect it to bring about similar results in the uterus if used with discretion and full understanding.

In an editorial in the British Medical Journal Listerism and War Wounds a review of antiseptics is briefly mentioned. The editorial At the outbreak of the war of 1914-1918 surgeons were far better equipped in knowledge and resources than in pre antiseptic days early experiences with gunshot wounds were so disturbing that a feeling of dismay at their in ability to check virulent infection swept over all Were our teachings fundamentally unsound? Had we forgotten the lessons we thought we had learned? The obvious thing was to go back to Lister To add to the general discomfiture a most respected bacteriologist wrote most con vincingly on the futility of antiseptics in general New antiseptics were sought and discovered Eusol came in then the Carrel Dakin treatment The latter certainly would have made a strong appeal to Lister himself. In it is fulfilled one of the principles for the application of which he searched so long the continuous renewal of an antiseptic which had no marked deleterious effect on the tissues Wound excision at the earliest possible moment with primary union delayed or primary suture as the wounds demanded antiseptic treatment Carrel Dakin-these were the principal methods finally adopted is a routine But it required fully three and one half years of their evolution on an unprecedented mass of human material

This editional is in error as to the time of evolution before its acceptance as routine procedure. It has not as yet been accepted as a routine measure and when presented in 1015-1916 to many so called leaders of the profession it met with rejection so it has been only by slow stages that the true ments of the method finally have become known. Even today adverse criticism and stren uous objections are frequently encountered. It will no doubt take many years to break down the prejudices and theories before a general acceptance and understanding can be expected. In the internal many lives will have been sacrificed unjustly. One is curious to know how much more unprecedented mass of human material is

necessary to convince the skeptical

The aqueous hypochlorite solutions with low alkalinity known as Dakins solution must not be confused with the chloramines dichloramines and similar synthetic products which are derived from coal tar Chloramines and dichloramines

TAB	LE I
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have little or no solvent preperties. It is the great solvent property of aqueous hyp chlorites which makes them so useful. It must not be inferred that any | anacer or cure all is being offered

FREQUENCY OF PUERPIRAL SI PSIS

Fothergill states that in a report of Queen Charlotte's Hospital in 19 1 leahing with 1700 cas s of which 234 were febrile 134 cases 86 per cent were regarded as puerperal pelvic in fection. Two of these patients died a fatality of

1 57 per cent \(^1\) study of British Maternity Hospitals show that the number of cases of pelvic infection varies from vear to year but it appears that 6 to 8 per cent of such infections occur of which 3 to 4 per cent die in other words out of every 1 000 con himements we may expect 65 to 86 cas 5 of infec

tions with 2 or 3 deaths
In a careful analysis of 3 500 deliveries in the
United States Euno reports 300 infections and 10
deaths 1 e 86 per cent infections and 2 5 per

cent fatalities

The estimated number of births in England
and Wales in 1920 was approximately 957 78 7
per cent were infected or 67 000 crises of puerperal peral
infection and 637 deaths from puerperal sepais
were revistered in that year. In addition to the
births there were about 2 abortions to every 7
continements. Thus there would be 10 000 addit
tional cas s of infection after abortion to arrive
at a total of puerperal pelvic infections, which
would make 10 000 to 80 000 cases in England
and Wales during 19 0

Thes statistics being used as a basis it is evident that if the same ratio of infection and births existed in the United States there were 186 332 cases of uterine infections and 65 587 deaths. In his report on Uterine Infections in the United States. De Lee says that 6000 women die annually from puerperal infections in this country.

An estimate of the population of the world in 1920 was 1 748 000 000 If the same ratio custed throughout the world in the same year there would have been 3 059 000 infections and 91 770 TABLE II-COLLECTED SERIES OF CASES

deaths These statistics are rough estimates but are not necessarily exaggerations of actual conditions. The death rate for puerperal sensis in the United States per thousand births is 279 or 1 in every 407 and our repistration is far from complete.

M Androdias professor in obstetrics and gynecology at the University of Bordeaux Francis in a report of a series of infections treated by the Carrel Dakin method states that 133 patients recovered in from 10 to 25 days after confinement the average being from 12 to 15 days. Irra ation was discontinued as the temperature came to normal. Table I gives an idea of the duration of the irra ation.

The author su gested this treatment to Dr Paul Titus an obstetrician in Pittsburgh and asaed him to make a thorough trial of the specially devised instruments and technique. This was done and he has made a personal communication

s tung forth the results in 8 cas s thus treated Titus was able to reduce the temperature and bacterial count of the lochia to normal within 4 to 8 days after chemical sterilization of the uterus was begun notwithstanding the fact that the treatment was instituted 2 3 4 6 10 and 1 days respectively after the initial rise of temper ature. The cultures were carefully taken by means of intra uterine culture tubes and in each cas the bacterial count per microscopic field was 60 or more bacteria at the beginning of treatment In every case in which the treatment was in dicated and us d there was a material decrease in the number of organisms within 3 or 4 days In one patient the manipulations caused a defi nite extension of the infection into the cellular tessues of the pelvis and suggested to Titus that the indications for this treatment are limited after infection is frankly established to the socalled putrid or shaggy puerperal endometritis cases

The most favorable cales are tho clin which the infectious process remuns localized and is not of more than for j days standing. In uch cales it technique is carefully carried out this hould show definite improvement in o day.

He also tates that the treatment i ideal and exceedingly implie in it taines of vaginal bouchs and infected permeal sutures. More times union will till result in a titched permeum so bill indied with infection that complete a tration and relaxation would ordinarily follow.

Folloving is a brief summary of the contreated by Dr. Titu

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abortion follows, criminal introduction of a bo : (In March 4, 19); the fett, was pared. The patient bad chill as if fever dume, the in bt., d co., iderable brimor thave. The next day, be was next seen by the hospital evince. Her temperature was 10 p.l.e; 10 % 10 00 pm. a foll mellire placenta and rierboranes were remo educider anasthesia. Per air and tibes we ein erted follow in the operation. The utenne batterial court, howed count was 3,50 000 red blood cell, and 19,400 lexcovite. On March, the tubes ard per air we charked Temperature and pulse we enormal. The patient con alsocrece way, u e entful.

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Cir. 4. Mrs. Anna M. No. 6876 was delivered on March 14 poj. at home On March 1. the p tient was admitted to the be-pital and her cale diagnosed as pinen inol. and the local pentomitis. Ind pite pentol pis. The temperature was 1076 pile 149. A blood court howed to 001 tococrtes. March 8 cultures were taken from the uterner Reta ned-secundanes and remains of mail blood color were very load. Per air and tubes we entroduced Laborators indiagns from the uterne material bowed a boardors indiagns from the uterne material bowed a doctor when there were 3 bacilia per micro-copic field on the mean there were 3 bacilia per micro-copic field 3 diplococia per micro-copic field and a lew treptococia.

b lean Lecocyte coa t wa, o ∞0 March 10 baternal courst bowed 60 h etens or abo e per ructor-copic feld be cill diplococci and red blood cell. On rest and on cell re there was a growth of beadl is pro eu bulran Lecocyte coa t wa, 10 ∞0 March | 20 the baternal count bowed 60 or no e hasterna per merorecope ci eld. Bacilli, and dip ococci were found on the mea hacilla poteu bleans were for rid in the culture. The leucocyte co it wa, 10 ∞0 March | 1 the blood cultures were regait e the Inconvete count was 110 on Lecocyte teo into March.

wa 500 March it the bacterial conthowed 600 more bacteria per micro-copic feld. On the mear there were red blood cell coccin a diamini. The leucocyte count was 600 and the rett dailt was 500. The bacterial count on March 6 flowed beteria per micro-copic fill and on March 6 there were no orman. The blood cultures were negative on March 21 and April 6 the fill coocyte out was 200 for April 11 the temperature.

was normal and the pulle was 110 to 100.

LNE MIS JR. H. No (4), bud a normal deli ero on Derembe 1914. On Ja 12n 3, 1917. a bre 1 tabetes was noted. Temperature was 10.4 plule 110 January 1, there we e 60 battern to the micro-copic nellice any and to beswere 1 erted a dithen rein erted on January 1, and 10 January 1 and 10 January 1 the batter I count was remait each ditherest day the temperature was normal On January 1 the tubes were removed.

On Ja Lan. It tubes were removed on the carbit day of puerper in On Ma ch 31 for the ra-pontarco deliver. On April patt in thad chill with nie of termerature to 10 of drees. April patt in the deliumith nie of termerature to 10 of drees. April pattent in and mitted to the hospital. Per arrival and tubes were in erted upil of 11 44 mol April the uterine culture howeld to or more bact na per micro-cope cied the mear howeld pre-improved and hadfil the growth was taphylococci. The blood culture was nevative and the leacoct te court via 13 no on that day. April of the bacterial count was 60 or more per micro-cope field. The mear howed to growth The feetocyte count was 1 coo. The bacterial count on Pipil 11 was 60 or more per micro-cope field. The mear howed no growth. Bood culture was nevative 4 April inter was an averare of hacteria per micro-copic field the leacocyte count was 16 600. April 14 there was an are a col 15 bacterian per micro-copic field the leacocyte count was 16 600. April 14 there was an are a col 15 bacterian per micro-copic field. The temperature was normal on April 15.

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LOCHIAL CHANGES

In 1919 Professor Perrota (8) in discussing Microbes in Lochia in cases treated by this method states. The lochia in puerperal women evamined by me was ordinarily cleared of bacteria in the first and second days following labor. On the third day in the presence of infection there was a shirty nes in the percentage of bacteria (100 t) 400 to every incroscopic held). The most favorable time for stating the Curel irrigation was in the first period 1e. the incubation period in the less serious cases 4 or 5 days were sufficient to sterihze the uterine cauty, in the more severe cases, t took, 7 or 8 days.

If there is not a progressive diminution of the bacteria or should they remain at the same level one should look for some error in technique. For sibly the tubes are kind ed or obstructed and closed by the presence of blood clots. There is a tendency during the first few days for the lochial secretions debins blood clot etc. to ckg the irrivating tubes. When the pressure in the container is increased free egrees of the solution from the tubes can be secured. The gross character sites of the lochia change rapidly so that within 4 or 5 days it is a s anty, thin transp. Fent secretion free from odor. With this change there is usually general systemic improvement due to the dimmution of epitic and totue process.

Bacteriological examinations of lochia and re tained contents should be made at each dressing. They will be of great assistance when studied in conjunction with clinical evidence in deciding when the infection is under control

Bacteria appear very abundantly in the febrile puerperium after 24 to 36 hours and the cocci are usually the last bacteria to disappear

CONCLUSIONS

- r Irrigation of the uterus with 5 solution of sodium hypochlorite of low alkalinity in combination with hypertonic saline solution destroys bacteria and dissolves blood clot-placental tusue and debits vithout destroving hving tissues and leucocytes
- 2 If started early this treatment may arrest local infection and prevent extension to adneva and blood stream

- 3 Septic endometritis puerperal or postator tum has been cured by the intermittent irrigation of the uterus with sodium hypochlorite solution
- 4 Repeated bacteriological examinations which are recorded on bacteriological charts are con tributory evidence of the state of the infectious process
- 5 This method of treatment should be used only in well equipped hospitals by skilled oper ators because special technique and armmentarium is necessary and keen judgment is required in the selection of cases. Moreover ill advised or carelessly performed attempts at such treatment will cause traumatic extension of the uterne infection.
- 6 The treatment is most useful in the so called putrid or shagp, pureperal septic endome tritis of mixed bacterial origin with marked sub involution of the uterus. If extension to the parametrium has occurred or is suspected aftempts at the treatment should not be undertaken.

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ARE PICRIC ACID AND MERCUROCHROME SOLUTIONS LOCALLY ANASTHERICS

BY DAVID I MACHE M.D. LLB BALTIMORE MARALAND fth Dep tm t f Ph m 1 gy J h 11 pk U er ty School f M d

ICRIC acid and oxymercuridibromfluores cein have been used considerably in the surgical treatment of burns the former having been employed for a longer time than the latter Solutions of these two drugs are highly colored and stain the skin. I icric icid solutions of o per cent or stronger have been painted over or applied as in dressings over burnt surfaces and according to some authors have been found to be exceedingly efficacious Thus Hare in his Pra tical Therapeutus states

It has been found exceedingly efficients in solution in the treatment of severe burns and The same author also speaks of 5 per cent solutions of picric acid as being antiseptic so that it may be used to disinfect the skin. It is well known however that this chemical when absorbed into the system will produce renal irritation and other signs of poisoning so that its use over extensive areas and in cases of deep burns is contra indicated as absorption might

occur and lead to poisoning

In the last few years various surgeons have been employing solutions of oxymercuridibrom fluorescein or mercurochrome 220 soluble not only as an antiseptic but also as a dressing for burns of the first and second degree Application of this drug has been claimed to be beneficial not only by virtue of its powerful antiseptic properties but also as a relief to the pain following burns and scalds Mercurochrome poisoning by absorption from the skin has never been re ported and in general the toxicity of this drug is much less than that of picric acid (7) In con nection with these uses of picric acid and Mer curochrome 220 soluble the author deemed it desirable to inquire into the mechanism of their sedative effect on burns and scalds and more particularly to ascertain whether these solutions exhibit any locally anæsthetic properties on the nerve endings of the affected areas

The methods employed in this experimental study were the well known classical procedures for determining and analyzing the local anæs thetic effects of drugs Three methods were tried in the present study. In the first series of experiments the local anæsthetic effects of the drugs were studied on the sensitivity of the rab bit's cornea The reflexes following the touch

ing of the cornea before and after instillation of the solution into the conjunctival sac were studied By this method no evidence of local anresthesia was obtained after instillation of either dilute picric acid or mercurochrome solu In this connection it was found that pieric heid by virtue of its acidity was much more irritating to the eyes than mercuroclirome solutions Indeed mercurochrome has been em ploved successfully in opthalmological practice by Chop and Martin () Burnett and Gaus (4)

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In a second series of experiments, the arres thetic properties of the solutions were tested by the frog skin method As is well known to all physiologists and pharmicologists this method is practiced as follows. The brain of a healthy frog is pithed but its spinal cord is left intact The frog is then suspended and each leg is dipped into a weak solution of acid. The irritation of the acid on the sensory nerve endings of the skin produces a reflex retraction of the limb from the beaker containing the acid solution. The skin is then washed off by dipping several times in fresh water The same limb is then immersed for a definite number of minutes into the solution to be tested and after the given exposure to the unknown solution its response to irritation by the acid is again determined. In this way it can easily be determined whether or not a local anasthetic effect has been produced. Such a local an esthetic effect is due practically entirely to a local action on the skin there being very little absorption into the general circulation in the short time through which the experiment is performed The author has repeatedly tested solutions of picric acid and mercurochrome 20 soluble for their local anaesthetic effects according to this method and in no instance was any local anæsthesia produced by the drugs even after an exposure of 15 minutes

The third method of investigation was the study of the effects of the solutions on the conductivity of sensory and motor nerve fibers according to the well known pharmacodynamic methods described in treatises on experimental pharmacology The experiments performed were made on the sciatic nerves of cats and dogs. After the exposure of the nerve and the cleaning of its

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ARE PICRIC ACID AND MERCUROCHROME SOLUTIONS LOCALLY ANASTHEFIC?

BYDAVID I MACHE MD LIB BALTIMORE MARALAND Dect fth Dp im i fPh m 1gy Jh H pk U ty Sh 1 f M de

PICRIC acid and oxymercuridibromfluores cein have been used considerably in the surgical treatment of burns the former having been employed for a longer time than the latter. Solutions of these two drugs are highly colored and stain the skin. Picric acid solutions of 0.5 per cent or stronger have been printed over or applied as in dressings over burnt surfaces and according to some authors have been found to be exceedingly efficacious. Thus Hare in his Pra tual Therapeutics states.

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sheath a pledget of cotton soaked in a given solution is applied to the nerve trunk for various periods of time. A blood pressure and respirators tracing is recorded on a kymograph and the effects of electrical stimulation of various in tensities applied above and below the block are studied on the blood pressure and the respiration curves on the one hand and on the con traction of leg muscles on the other hand. In this way when a typical local anaesthetic such as cocaine is applied to a nerve pharmacologists have found that the conductivity of the sensory nerve fibers is paralyzed long before that of the motor nerve fibers but that after application of strong solutions of the local an esthetic for prolonged periods of time the motor fibers are also finally depressed or completely paralyzed The author studied the effect of application of solutions of picric acid and mercurochrome to nerve trunks in this way and found that they produced ab solutely no effect on the conductivity of either

sensory or motor nerve trunks It is therefore evident that neither picric acid nor mercurochrome employed in the treat ment of burns possesses what may be called true local anæsthetie properties Their sedative effects in cases of burns must be explained other ways It is possible that the acid solutions of pierie acid produce protein precipitates i hich act somewhat as protectives On the other hand the acid properties of tri nitrophenol are not conducive to the relief of pain The action of mercurochrome solutions in burns must be explained in other ways. This drug does not precipitate proteins and therefore cannot be said to form a protective layer of an albuminate on burns. It is possible that it may form some other loose combina ion with body suices. Its sedative effect must also in a measure be due to its slightly alkaline reaction. It is known clini cally and has all o been proved experimentally that alkalies are much less irritant to the tissues than are acid solutions

The author also carried out another series of experiments relative to the combination of the solutions of the two drugs with a local anæsthetic. As was shown some years ago benzyl alcohol or

phenmethy lol possesses powerful local anæsthetic properties (5) Two and 3 per cent solutions of this drug can be and have been employed as local anæsthetics in surgery (6) In addition to their local an esthetic properties such solutions are also mildly antiseptic (8) and it has been shown by the author that benzyl alcohol has very low toxic ity indeed. The author also experimented with mixtures of pieric acid with phenmethylol on the one hand and mercurochrome solutions and phen methylol on the other hand By incorporating r or 2 per cent of phenmethylol in such solutions it was found that they become distinctly anasthetic on local application as determined by the methods already described. It is therefore suggested that the addition of phenmethylol to these solutions may serve a useful purpose

SUMMARY

1 Solutions of picric acid and oxymercum dibromfluorescein (mercurochrome 220 soluble) were tested in regard to their local anasthetic properties by a well known pharmacological method and were found to be not locally anas

2 The sedative effects of mercurochrome and picrie acid solutions in the treatment of burns and scalds must therefore be explained in other ways

3 B3 incorporating z or 2 per cent of phen methylol or benzyl alcohol with these drugs such solutions can be rendered locally anæsthetic and may therefore become more useful for clinical purposes

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EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

FRANKLIN H MARTIN M D ALLEN B KANNEL M D Managing I d ter

NILLIAM J MAYO M D

Chi f of E literal Staff

JUL% 1928

ASPIRATION VERSUS EMBOLISM IN POSTOPLRATIVE PNEUMONIA AND PULMONARY ABSCESS

IN addition to the massive and usually fatal embolus caused by the separation and mobilization of a large fragment of a thrombus occupying some such large vein as the femoral or the iliac (gross embolism) there is a second form of embolism, of more frequent occurrence which may give rise to symptoms simulating pneumonia or lead to pulmonary abscess This condition (minor embolism) was lucidly described by Conner in cases of typhoid fever and later in other cases of apparently healthy persons. Its significance as a postoperative complication was suggested in 1900 by Mikulicz It is extreme ly difficult to differentiate at the necropsy table between areas of pneumonia arising on the basis of an infarct and those resulting in dependently or from aspiration and of late years Cutler and others, following Mikulicz s suggestion have come to the conclusion that the large majority of the postoperative pneu monic conditions formerly considered to be due to the anesthetic and infection of the lung through the respiratory tract are actually embolic in origin. Cutler arrived at this point of view as a result of an extensive clinical study supplemented by experiments in which he and his associates were unsuccessful in dogs as others had been in producing pulmonary infection by the aspiration route while succeeding with infected emboli

Fetterolf and Fox and more recently Schlueter and Weidlein and Holman Chand ler and Cooley have contributed further experimental evidence that infected emboli may be responsible for the development of pneumonia and pulmonary abscess

As a result of the studies quoted there is a growing conviction that the adherents of the embolic theory of postoperative pneumonia and abscess have the best of the argument and yet there is reason for hesitation before accepting their conclusions. The results obtained in the experiments cited were by no means uniform and apparently even a viru lently infected embolus may produce in an otherwise healthy lung nothing more than a mild inflammation all signs of which rapidly disappear In actual practice especially in virtually asoptic operative fields it is some what difficult to imagine the occurrence of virulently infected emboli. Furthermore, as Conner found in his study of pulmonary in farction in typhoid fever pleural pain and hemontysis while not constant are common symptoms in embolic disease while in acute postoperative pulmonary complications par ticularly those that start during the first two or three days after operation as most of them do pleural pain and hæmoptysis are notice ably lacking

Cutler and Schlueter compiled from the literature 1 908 cases of pulmonary abscess of which so per cent were postoperative. They did not attempt to explain the remaining 70 per cent but apparently regarded abscess following pneumonia or bronchiectasis as essentially different from abscess developing after an operation Smith takes exception to this. There is no material difference in the bacteriology of 66 cases from the literature in which the predisposing cruse was known and in which bacteriological and pathological studies had been made len of the e were postoperative and 46 spontaneous post bronchiectatic post pneumonic and so forth In all lesions two or more of the following organisms were found spirochetes fusiform bault cocci and vibriones an as ortment that frequently occurs in ton illar crypts and fround the teeth. These data Smith regarded as offering strong presumptive evidence that the oral cavity was the usual source of infec tion in both non operative and postoperative pulmonary abscess and he therefore attempt ed to produce pulmonary abscess in mice cuinea pigs rabbits and dogs by intratrached inoculations of bloods material obtained from about the teeth of patients with pyorrhan He an estherized the animals with ether and introduced the material into the trackes so that it trickled down into the lungs a tech moue designed to simulate the circum tance under which an inasthetized Datient aspi rates material from the mouth By this pro cedure he succeeded in producing aspirative pneumonia and abscess where others had failed Fifty per cent of his animal died of pneumonia and o per cent developed pul monary ab cess The three dog pre ented no pulmon irv le ions. The absence of effect in these and in the animals that remained well he explains by natural resistance by a differ ence in do age or by an active cough reflex

In view of the results of Smith's recent experiments it would seem somewhat hasty to accept the rather radical suggestion of the exponents of the embolic theory that all effort to limit the frequency of postoperative pul monary complications be directed to improve ment of surgical technique

RUSSELL M WILDER

POSTOPERATIVE SURCICAL INTERVENTION

ONSIDI'RABLI, stamma is required to initiate and carry out postoperative surgical procedures. Possibly this is because of a fear of reflection on the surgical skill exerci ed primarily or because a second are operation to relieve a complication is often blumed for what may have been an inevitably unfavorable termination. Clinical and surgical judgment are often taxed to the utmost in these emergenci. Too often the decision to interviene surgically is delayed beyond the time of greate trafety and possible bureful to the patient.

C H Mayo referring to exploratory invetigation as a primary operation often states that he has seen no harm come from early incision when the clinical detail are ob cure but that many times the mortality is high or the benefit small if operation is delayed until the condition is self-evident. The same dictum may be applied to postoperative procedures and is a great comfort in times of site.

Bleeding and dyspinces following thyroidec tomy may endanger the patient. Pre sure from blood clot bilateral or even unilateral recurrent larynged nerve injury with cord parally is and tarely collapse of the trache, are the usual ob tructive factors. I rompt open mg of the wound turning out of clots eather this bleeding vessels or performing trachect omy are life swing measures. This usually

results in wound infection and probable sub sequent tissue distortion but this is a minor incident

Following gistric surgery there is often a fertile field for what Bartlett his called chinical clair og ince Indeed the cause of the trouble may not be clear after exploration

When prompt frequent and intelligent lavage demonstrates that the stomach is not emptying not too much delay should be engaged with the blood chloride balance intravenous glucose and rectal nutriments. Freeing of a distal jejunal limb twisted or folded in fresh plastic adhesions entero enterostomy between the proximal and distal loops of the jejunum or jejunostomy for drainage and feeding purposes are efforts that are nichly rewarded if opportune.

The convalescence often unduly prolonged following pleural drainage may be shortened or a fatal termination as oided by alert judicious surgery. Retention of pus is usually the cause of the fixed or increasing debility. Enlarging the opening placing it lower to drain the most dependent point in the abscess or raising it to a higher level if contraction or formation of granulation tissue has raised the floor of the cavity are valuable measures. It is never aims to consider the possibility of the presence of incarcerated drainage tubes or gauze packing.

Surgery of the biliary tract sometimes presents the postoperative problems of bleeding common duct stenosis, or escape of bile into the abdominal cavity. Probably there is more reluctance in reopening this field than any other. Bleeding from the cystic artery may be quickly fatal and that from the liver notch very alarming. Persistent or promptly appearing jaundice brings up a host of speculations none of them pleasant. Bile produces a low

grade pentoneal irritation and stupefying reaction that is sometimes difficult to analyze Timely skillful secondary surgery is a great beneficence in this field

Appendicitis stringulated hernins and intestinal resections all carry potential post operative difficulties in which reasonably prompt action may be the patient's only sale viction. Stagnation or reversal of the frecal current from an ileu peritonitis or frank obstruction usually accounts for the picture presented. Jejunostomy is not always successful under these circumstances but it often results brilliantly in a seemingly hopeless ituation and its performance adds very little to the patient's crushing load.

McVicker Crile Walters and others have introduced valuable measures preparatory to operation that obviate many postonerative complications. Many things can be carried out during an operation that are likewise effi-Exploration for possible unexpected pathological conditions with exposure and isolation of the involved area with packs that also protect adjacent tissues from injury or contamination is good prophylaxis Certain hemostasis careful dissection the clamping and cutting of important structures well iso lated under vision helps to avoid subsequent trouble Placing a tube in the jejunum or ileum when peritonitis ileus or temporary bowel obstruction are imminent should always be considered. Tew patients are so desper ately ill that necessary haste makes the application of these principles impossible

Continuous consideration balanced judgment and real stamina are called upon not only to avoid unnecessary postoperative invalon but also to initiate action while there is reasonable safety and chance for relief

PAUL A WHITE

MASTER SURGEONS OF AMERICA

CHARLES BURNAM PORTLR

HARLES BURNAM POP IFR was born in Rutland Aermont January 19 1840 and died in Biston May 21 1909. He came from good old Engli h stock. His original American ance for Daniel Porter came to this country about 1650 and settled near Farmington. Connecticut. He was a surgeon and bone setter of note.

The story of the Porter fumily is that of one of the most remarkable medical families in America and it is doubtful if it could be duplicated. Upparently the male descendants of Damel Porter throughout seen generations in this country were all doctors. Charles Burnam I orter the subject of this sketch was the seventh physician in his family in direct decent. There have been altogether eighteen physicians of this name of whom there is a record. The son of Dr. Porter. Dr. C. A. Porter is a prominent surgeon principling in Bo ton at the present time. He too has a son contemplating, the study of medicine All of the members of the family lived active lives in western Connecticut Massachusetts and Vermont. Several of them attained considerable reputation as surgeons and bone setters. James Porter the great grandfather of Charle Burnam Porter was a Vermont Tory. He received a commission as surgeon under the British flag and served in Howes Army of invasion on Long Island.

Charles Burnam Porter grew up a vigorous out of doors lad in Vermont At the age of eighteen he entered Huvard University and was graduated with the A B degree in 1852. He at once began to study medicine in the old North Grove Street School and passed from there to the Massachusetts General Hopital where he served as interne in 1864. He was graduited in medicine from Harvard Middical School in 1865, during the Civil War. He immidiately went to Washington looking for Army Service and by dint of great per everance succeeded in obtaining an appointment on the stull of one of the principal multiary hospitals where he served with great credit until the end of the War Within a short time after receiving his appointment he was placed in charge of one of the large surgical wirds. It is a matter of record that he had at one time as many as seventy four cases of compound fracture under his care which in those days of septic wound meant a deal of dressing and per onal attention



In June 1865 he was married to Miss Harnet A Allen of Cambridge. At the close of the War he returned to Boston. Three years later he went abroad with his wife and two children studying for nearly two years in Vienna. Berlin and Paris. Returning to Boston he received important professional appoint ments in rapid succession—physician to Out Patients. Massachusetts General Hospital in 1866 district physician in 1866 physician to the Boston Dispensary in 1867 assistant demonstrator of anatomy. Harvard in 1867 demonstrator of anatomy under Oliver Wendell Holmes in 1868 visiting surgeon to the Massachusetts General Hospital in 1875 instructor in surgery under Henry J. Bigelow in 1879 assistant professor of surgery in 1882 professor of clinical surgery in 1885 which position he held until 1903 when by reason of the age limit he automatically retired.

Dr Porter had trught medical students continuously for 37 years a record almost equal to that of Henry J Bigelow's 40 years in the same institution. As a result of his work through those 37 years he came to be regarded as one of the soundest clinical surgeons and one of the best trachers in New England a man of singular simplicity of life rarely given to speech in public or the writing of professional papers. The arts of the medical politician were foreign to his make up, and his steady advancement in Harvard and the Massachusetts General Hospital were through ment alone. While his appointments at the Harvard Medical School and the Massachusetts General Hospital were purely surgical in character, he always combined general practice with surgery, and had for many years a large private practice in addition to his hospital and medical school work.

His contributions to medical literature were not voluminous consisting chiefly of papers read before medical societies and publications in medical jour nals on a wide variety of subjects in which at the time he was particularly interested. Perhaps his special interest lay in the line of plastic surgers in which he excelled. No one of his numerous assistants or students can look back upon his service with Dr. Porter without recollecting with great pleasure and satisfaction the manual detenty technical skill and surgeral judgment which he constantly exhibited in all of his work. It was a real joy to watch the neat ness and exactness and dispatch which always characterized his work. His flaps always fitted perfectly he never had to trim them. In typical operations of all kinds he was a past master. His work was made more efficient, undoubtedly by his long anatomical training and familiarity with the teaching of operative surgery.

An outstanding characteristic of Dr Porter's work was the uniform kindness and consideration which he always showed to his patients and to his staff as well a quality of heart which greatly endeared him to all those who served under him in fact to everyone associated with him in any capacity. There

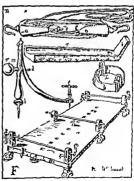
linger still in the memory of those who so greatly profited by his professional counsel and personal kindness grateful recollections of the great privilege and benefit they obtained through association with him

The qualities of head and heart here so madequately set forth the long years crowded full of fruitful service to his fellow men as teacher and practitioner of surgery his contributions to the science of surgery and his extraordinary proficiency in the practice of its art all entitle Charles Burnam Porter to an honored place among the master surgeons of this country.

J M T FINNEL







THE SURGEON'S LIBRARY

OLD MASTIKPHICLS IN SURGERY

ALITED BLOWN MID FACS OMMA NEBRASKA

THE SURCICAL ALMANDATARDA OF JOANNUS SCULTUTES

REVIEW of the surgical books of the ev n teenth century shows that the major; rtion of the literature of that period on 1 t | lilmo t wholly of the description of clinical eas a m r r iteration of details with practically no attempt male to draw conclusions from them which might e till lish either a surgical pathology which would prove acceptable or a therapeutic method whi h stand the test of continued application blush this fact appears remarkable an I almo t un believable that a number of men such as the e were capable of clear headed observation and with such an enormous mass of clinical material at han I on which to employ this observation-should be content - ith the mere description of individual eres in I thin let the matter rest. For the explanation of this fact one must turn from surgery and look into the con dition of its sister science-internal medicine

The seventeenth century was the era of the in troduction of the systematists in medicine Paracelsus had been the most prominent medical bolshevist of the sixteenth century it was nitural that some of his peculiar ideas—especially thos which had to do with the supernatural and mysticshould be recamped and brought forward as a ses tem to explain the ills that flesh is heir to The humeral theories of Hippocrates and Galen were no longer tenable so adopting nearly all that vas bad in I aracelsus such as his weapon salve and sympa thetic powder his followers harked back to the Her metic books and Cabala and aligned themselves with the Zoroastrian doctrines The e doctrines of Paracelsus had a good deal of chemistry of a sort in them and were later to serve as the stepping stone to a more sane chemical idea but before this came about there was an intermediate phase in which these pantheistic ideas were amalgamated into a system of mysticism and piety founded upon a chemical basis by Van Helmont who was a chemist a vascillating doubter of all fact and finally a theosophist The by stone of the system was that the fundamental basis upon which the body depended for its existence was the Archeus and anything wrong with the body was due to a change in it

Following Van Helmont came the Introchemical (Healing Chemical) system of Sylvius which was based on chemistry as developed from alchemy and proved to be the infant beginning of modern chem

i try. Though being unwilling to relinquish entirely the idea of a fundamental spiritus and innate hat of the heart nevertheless the circulation of the blood and action of the lympland chile was recognized and a system built upon these in an attempt to harmonize the old theories and newer facts. The fundamental basis of general pathology was that health was due to a proce soffermentation in the boly without either an acid or alkaline salt—a condition of perfect neutrality. Let either one acid or alkaline become predominant and disa e appeared.

As opponents of the introchemists came forth the intromechinical school which founded its ideas on the solid portions of the body which they weighed and measured calculating from the mathematical results the various errors of the body in discrise Respirition wis bised on the mechanics of the thorax digistion on trituration of food and so on through the functions of the body. The bisic idea was that health was determined by a smooth and even carrying on of mechanical and physical functions.

With these various inproven and in many in stances far futched decis serving a shones of contention to be fought over by the medical men the sureons realized that they in their field were dealing with facts and had better let others theorize as they wished. Consequently, they held themselves to this line and contented themselves with describing and publishing surgical conditions as they observed them Surgical technique was however improving and its tools were multiplying by leaps and bounds. It was therefore natural that an attempt should be made to standardize this part of surgery as Dalla Croce had done nearly a century previously.

This task was attempted by Johann Schultes better known as Scultcus the city physician of Ulm who published the fruits of bis lahors in a book called The Armamentarium of Surger; in 16,3.3 The volume is of particular interest because of the beautiful and numerous illustrations which show not only the in struments themselves but also the technique of many surgical procedures. The Scamnum Hippocrates or fracture table is shown in the lower right illustration and the beginning of a Casarean section in the upper

upper
The armamentarium is followed by the usual
century of observations a record of a hundred
cases of more or less surgical interest but the popularity of the book, which went through many editions
was determined by its value for technical purposes

REVIEWS OF VEW BOOKS ON GINECOLOGI AND OBSTITRICS

B I LIER F DL BS MD FACS OMARA VEBR SEA

L are indebted to Herb t R Sp cer for a hi torical sketch of Brit sl Mida ferv em bracing the period of 650 to 1800 In the introduct on we ar g v n the story of the Chamb r las and the midwif ry for eps. In succeed g chapte the author pres nts sketches of the liv of such men as Will am Harv v John Maub av Sir Fielding Ould William Smell John Harv William Hu ter Cha les White Will am O bo and Thomas D nman

Th se biographic I sketches are compani d by excellent phot graphs of the founders of B t sh mid fer In chapt II whear talof the lampoons and datribes aged ag st th ma mid fe Chapter III resents a h ton 1 sk t h of puerperal f and ch pt Il ge a b f r vi of the contribute s of B t b bst tr ian

to the beginning of the ninct the nt ry The story s ell told nd ill b ppr ciated b all who ar intersted n the d clopm nt f th

obst t cart

A NOVEL flatty e of the adm alle ok of Banister and his asso ates 1 n h torn al sket h of Oue n Chalott a M t mit Hosp t l founded n 7 9 and reput i to be the c let ling in hospital in Gr t B t Th sk t b is mb ll sh l by a pct f Charlott Que n f Gr at Br tain a ve of the origin | Ma or Ho s nd of the first Que n Cha l tt Hospital

k on TI P to fObitis is cred ted to si memb rs of th hospital staff and ma b s 11 to ha e fairly achie ed the impo bl in that it is rem rhably ell adapted to b th the eds of student and pract to s of m d 1 e Its scope Il vithin the r g of the m dical stul nt a d vet it p s nts in detail the various subjects and n a manner th t cannot fail to meet the pract al everyday ne d of th g ner l proctitione
Th chapter on hym rh g s in arly pr gna v

a masterpiece a d refle to the highly co t e ttitude of the authors. It may not b amis to remak that not all read rs llage with the autho s in the r manag m nt of the s pt ut us The following q of tion is the one n q est

After the uteru h s b n cmpt ed a rubb gation tub should be pleced in the avity e h ing t the top of the fu d s and st tched to the cr by coupl of catgut sutures By me us of the tube which shuld be long e gh to

be strapped con entently to the thigh arrigations of the uterus are made at t o hourly interval during the day and four hou ly during the night For their purpose Milton's fluid to per cent or cusol or glycen e just colored by the addition of t cture of 10 line is used \ lass syringe hold ng a on ces is used Irrigation and drai age of the acutely septic uterus is the surest and quickest me n of claring up the 1 fection and p eventin th extension of the local infiction into the blood

In ref rri g to the prognos and ffects of treat m nt in eclamps a the authors frankly admit of Iffculti s in app ent impovement may be I ly foil ed by deterio ation and a pat ent d sper telv ill v th rep ted con ulsions may as

promptly ch g for the b tter The sults of tr tment s v the uthor are most diffcult to timate It req a v v large n mber of cases t j th any o clusions so esp ciou is the lis as Wh n as often happe a recovery is s lie and dramatic the rem dy hate rit may lists needstior the eu. Thus ve field that imm de delieve aginal or bdomial cas c ection reg rded by som as the only m thod while others r g d all op ative delivery

source of da ger a d put ther t ust in various forms of m d cal treatment. The nuthors ob erve that the mo tality to d to rise in proportion to the

t re subje t f obst tr s s pr sented in a log at ell ord r d ma ner the llustrations have go it whin lue The rve e recomme d th o kas a te t our m d al schools and as a refe e ce book o the sh l is of our practici g ntole st n

PROTESSOR G o g Winter of Loengsbe g pres ts a monog aph o op_nt b tet cs fo practitioners and stul ts The ork m v be s d to be the ep on of the thfer is of p rience in the tach g of oper t ob t trics

d e find the subject pre ted in a man r that refl cts the art of th t ach r We note that the autho bs n orporated h contributio to the Halb n S t Bilgie und P th lgi d Bibes on Diag ose and Behandlung d muette l che Verletzung n und D Bh ndlung d s Abort

al a ch pter by Benthin on 1 ps s and 4 t p Nark se together th a chapter cont b t d by \ ujok on Diagnose und B ha d lung der kindlichen \ let u g a d a seco d chapter n D1 Behandling de k dichen Asphy

L T.C. T.E. A 27 tvo S.

D. B.P. Reso D. Ge. W. B.1 d.1 L.b.

The pages are not burdened with introductory chapters on the preparation of the patient operating room and materials for operation anaesthesia and kindred subjects. In the opening chapters he proceeds at once with the subject in hand. It is apparent that the author is endeavoring to pass on to his readers the wealth of clinical experience which has acquired in his years of clinical instruction and in this we believe that he has succeed d most admirable.

To emphasize the dangers of interference in the process of labor the nuthor hads a mortality of or per cent in natural labors as agrunts o 3 per cent in forceps cases o 4 per cent in extractions 21 per cent in crearcan sections o 7 per cent in manual removal of the placenta and o 5 per cent in crain otomics. Winter records oo cases in which the placenta was delivered manually with 18 deaths three of the number died from rupture of the uterus one each from nephritis emblism and celampsia, from hamorrhage and 3 from infection

In the presence of tuberculosis of the lungs the author would interrupt the pregnancy in all cases of active tuberculosis prior to the end of the seventh month of gestation. After the seventh month he would reserve interference for only the early cases and for those in which the op ration is performed

solely in the interest of the child

Valvular disea e of the heart without loss of compensation is not an indication for the interruption of pregnancy with the possible exception of mitral stenosis. When however the heart kision is associated with a chronic nephritis or with tubercu losis which is either acute or chronic there exists a positive indication for the interruption of pregnancy.

Keinen Abort zu viel und Keinen zu wenig no fetus shall be sacrificed unnecessarily and no mother s life shall be imperiled or her health ruined for want of the destruction of the unborn fetus

The illustrations are abundant and splendidly executed. Such operative procedures as the vaginal casarean section the application of the forceps version and extraction craniotomy embryotomy and abdominal crasteran section are graphically illustrated in the several stages of the procedures. The chapter on injuries to the newborn is unique and instructive. In it are many suggestions which are of great value in the care and management of these lessons.

THIS little work of Comvns Berkeley and George M Dupuy! is unique in that it is in no sense a text on the subject but rather a well ordered collection of illustrations accompanied by descriptive legends Thus the anatomy and physiology growth of the fetus pregnancy and labor and finally the treatment of the patient and her child after birth are presented in a logical order in the

A. Arlas PMmwr By Cmy b 11; MA MC MD (Ca lab) FRCP (Lod) MRCS (Eg) 1 Geog MD py MD Lod dA wh k Will m Wood dC 96

form of pen drawings together with a condensed and lucid descriptive legend. There is much merit in this work of 150 pages

THE admirable work of Heuser2 presents the suh Lict of radiology in genecology obstetrics and urology not as a substitute but rather as a valuable adjunct of the clinical examination and as a collabo rating agent. In the field of gynecology, the limita tions of air injections alone are discussed and the advantages of the employment of lipsodal sodopin and similar media u ed in conjunction with in sufflation are presented. The author advocates the utilization of lipiodol diluted to 50 per cent con sistence with sterile olive oil this affording a medium less viscid and one that requires less pres sure in its introduction. To obliterate the discon certing shadows of freed material and gas in the large bowel the author gives a cathartic the day before an enema of salt solution one hour before the examination and then injects one and one half liters of a similar solution just before the examina The bladder is injected to the point of moder ate distention with air

In the gravid or suspected gravid uterus lipiodol should be used only when an actual doubt custs as to the condition and a clarity of information is necessary. The author states that so far he has seen no abortions when adequate precautions are observed. Until the fetal parts and membranes completely block the uterine canal the patiency of the tubus can be demonstrated. In advanced pregnancy the lipiodol will not advance beyond the certify.

The author opines that insufflation of the tubes can only demonstrate patency and it remuns for lipiodol and similar media to provide the information as to chibir position and integrity of the

tubes

It is claimed that the fetal parts can be vibualized as early as 3½ months but the author recognizes the difficulties of the employment of radiography in obstetric cases

The author indulges in much detail in the utili zation of lipiodol in the visuali ation of the urinary

bladder kidney and ureters

The monograph is richly illustrated with skia grams. All in all this work of Heuser is very at tractive and instructive

THE recently published work of Crossen on Gyuccology for Aurser's is a most attractive production. It is beautifully illustrated and contains a wealth of information suited to the needs of the nurse. After a brief presentation of pelvic anatomy and physiology, the author proceeds with a recital of many of the gynecological diseases and in this chapter the author has restrained him self from indulging in too much detail.

LR C TE CYMÉ LOCIE O ÉTR QUE TE U LOCIE By D V d C 1 m H & B Os A es 9 6 Gry Cologo 70 vrs By H y St 8 C Os M D FACS St Lo is Th C V Vooby C mp y 9 7 The chapters on treatment both non operative and operative are profusely illust atted a d g ven to much valuable detail as are also the chapters on preparations for gynecological evaminations preparations of supplies for operations and preparation of patient.

The reviewer makes boll to suggest that in subs quent editions of the work ve may be favored vith a presentation of such subjects as amenorithea hemor hage leucor hem a sterility and backache—th it causes and the means employed by the nurse in their control

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

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PRELIMINARY PROGRAM FOR BOSTON CLINICAL CONGRESS

THE surgeons of Boston are planning a highly attractive program of clinics and demonstra tions for the eighteenth annual Clinical Con gress of the American College of Surgeons to be held in that city October 8-1 A preliminary program of the clinics and demonstrations is pre ented in the following pages This program is to be revised and amplified during the weeks preced ing the Congress so that the final program will completely represent the clinical activities of that great medical center in all departments of surgery Clinics will begin at 2 o clock on Monday after noon and continue through the mornings and afternoons of the following days

General headquarters for the Congress will be established at the Statler Hotel where the ball room foyer and other large rooms on the mezza nine floor have been reserved for registration and ticket bureaus bulletin boards exhibits executive offices etc The ballroom at the Copley Plaza Hotel will be utilized for the evening meetings hos pital conferences and other large gatherings

The annual hospital conference opens on Mon day morning in the ballroom of the Copley Plaza Hotel An interesting program of papers round table conferences and practical demonstrations dealing with the many problems related to hospi tal efficiency is being prepared and will be pub lished at an early date A feature of the hospital conference will be a special session on Wednesday

afternoon devoted to a symposium dealing with the standardization of the ophthalmological and otolaryngological departments in general hospi tals The conference is planned to interest sur geons hospital trustees executives and personnel generally and an invitation is extended to all per sons interested in the hospital field to attend the conference

An interesting feature of this year a session will be a showing of the surgical films that have been produced under the supervision of and approved by the American College of Surgeons A number of these films have already been completed and others are now in course of preparation and will be ready for their premier showing in Boston

An application for reduced railway fares on account of the Boston session is pending and we are assured that a rate of one and one half the ordinary first class one way fare will be in effect from all points in the United States and Canada

EVENING MEETINGS

The Executive Committee of the Congress is preparing programs for a series of evening sessions The Presidential meeting on Monday evening will be held in Symphony Hall At this the first for mal session of the Congress the president elect Dr Franklin H Martin of Chicago will be inau gurated and deliver the annual address On the same evening Professor Vittorio Putti professor

of orthopedic surgery at the University of Bolo gna Italy and director of the Pizzoh Institute will deliver the Murphy Oration in Surgery. Ses sions on Tuesday Wednesday and Thursday eve ings will be held in the ballroom of the Copley Plaza. On Wednesday evening members of the Clinical Congres will be the guests of the Boston Surgical Society at a pecial meeting of that soci ety on which occasion the Bigelow medal 1 to be awarded.

Of special interest will be a sympo ium on the transplantation of ureters with papers by Drs Charles H Mayo Robert C Coffey Arthur H

Curtis and others

The annual convocation will be held on Friday
evening in Symphony Hall at which time the 1928
class of candidates for fellowship in the Colle e
will be received. The fellowship addres is to be
delivered by Dr. William J. Mayo.

A number of distinguished surgeons from abroad them being sur George A Some of Malvern Australia president of the Vustralasian College of Surgeons Sur Charles P B Clubbe of Sydney Australia Professor Archibald youn and Dr Farouhar Macrae of Glassow Scotland

LIMITED ATTENDANCE ADVANCE REGISTRATION

Attendance at the Boston session will be limited to a number that can be comfortably accommo dated at the clinics the limit of attendance being based upon the result of a survey of the amphi theaters operating rooms and laborationes in the hospitals and medical schools as to their capacity for accommodating visitors. Under this plain it will be necessary for those who wi h to attend to register in advance.

Attendance at clinics and demonstration will be controlled by means of special clinic tickets which plan has proved an efficient means of providing for the distribution of visitin surgeons among the several clinics and insures a unit of crowding the number of tickets issued for any clinic being limited to the capterity of the room assigned to that clinic.

BOSTON HOTELS AND THEIR RATES

Since the 1922 session of the Clinical Congress in Boston a number of new hotels have been built including the Statler with 1300 juest room. Several of the older hotels have been rebuilt and enlarged so that there are not ample first class hotel accommodations in Boston for all who wish to attend. Many of them are located vithin short walkin distince of the headcasters hotels.

R m B co hld з Вез \$ \$3 5 H II H Be c 4 Ba do HIII Rea n St 5 464 Comm Ith 1 7 4 LPult d Cl 3.5 5 B km 645 B t 4 te b ry 4 Ch I t W 4 5 Chlgt Chal & t L't M and B a St 5 3 C pley Pl C pl y Sq ā 7 T mot St 3 5 5 t 534 B c ā hn Cha I te W 3 406 C lth A e 3 5 đ B sl t 5t 3 5 45 Ch 1 St 4 Γm t d Shel 5ts 3 5 5 30 C m u lu t 1th A 3 5 I t C Al tn d N 5 9 ByStt Rod 6 Smista Ci C mm n alth 4 5 t ir! t ٩t 3 5 Bylt Cmm d Tr m Tra dD tmo th 8 7 ìth D tm thad C mm 6 te C pley Sa r 5 Amr nPl

REGISTRATION FLE

A re_stration fee of \$5 00 is required of each sur con attending the annual Clinical Con_ressuch fee providin the funds with which to meet the expenses of the meeting. To each surgeon regi tening in advance a formal receipt for the registration fee is issued which receipt is to be exchanged for a general admission card upon his regit tration at headquarters during the meeting. This card which is nontrain ferable must be presented to secure clinic tickets and admission to the evening, meetings.

PRELIMINARY CLINICAL PROGRAM

GENERAL SUNGERY GYNECOLOGY OBSTETRICS UROLOGY ORTHOPEDICS

VESSACHUSETTS GENERAL HOSHTAL

Monday Dry chinic

Orthopedic ervice— NATHANIEL ALLI ON Tuberculo 1 of the kn P D Wilson Tuberculo 1 of the pine

DR M \ SMITH I FTERSEN Tub reulo 1 f a ro thac R & GHORMLEY Internal derang m nt of kn 101nt NATHANIEL ALLI ON and DR KLEIN Con nital dis

location of hip Surgical servic -2 Dry clinic I H MEANS E I RICHARD ON and CLOR & H LMFS

The thyroid GLO GE MCIVER Burn

infections

DRS WRITE and SPRAGUT The heart in urg C M Jones The gall bladder J H Menns Surgical cales

Te sday

J D Burney and staff-o Genito-urinary operation Surgical service-II Surgical op ration

D I JONES- Dry clinic Canc r of ga tro int tinal 1 PORTER-2 \ ray burn

W J MINTER [B AVER and J S HODGSON-Surgery of the nervous system operations and demon tration of cases

J \ MEIGS-2 Uterin bleeding etc L S Mckritrick-2 Radium in cancer of the rectum ARTHUR ALLEY and R H SMITHWICK- C reulatory diseases of the extremities po toperative pulmonary

II ednesday

DES WYMAN WHITTEHORE CHURCHILL and LORD—9
Thoracic utg ry operations
R C CABOT and Miss CANNON—2 Social se ice DR BREWSTER-2 Surgical clinic

DR LLOYD and associates— Syphilis and surgery F \ WASHBURN-2 Farly day of the Massachu etts

General Hospital first ether anæsthesia DR SIMMONS- Surgical cases

WILLIAM HERMAN - Psychiatry and surgery DR HOLMES and associates—2 Demonstration in \ ray department

Thursday

Orthopedic ervice-9 Operati ns and demonstration of

DES WILSON and DANFORTH Arthritis of pine
NATHANIEL ALLISON and DR COONSE Arthritis of Line
WILLIAM ROGERS and DR STRAUMER Arthriti of hip R. L. GHORMLEY and DR Low Poliomyebti WILLIAM ROGERS End result studies Fracture service-2 Demonstration of cases DRS VINCENT and A. V BOCK-2 Dry clinic The

E P RICHARDSON— Hernia through cardiac onfice of

diaphraem LINCOLN DAVIS -- Cancer of cæcum duodenum and gall

bladder DR HANFORD (Presbyterian Ho pital New York) and RICHARD MILLER-2 Clinic on surgical tuberculosi Dr Daland Clinic on plastic surgery

Dr Shedden-2 Surgical clinic

Friday

Staff-o Surg cal operations

C A LEAND-1 Fascia repair of hernia
DR. C A FORTER BREWSTER JONES DAVIS RICHARD
SON and WILLIAMS-11 Surgical clinic

I B GREENOLGH and as o lat 5-2 Tumor clinic DR McINER-2 Ca tro intestinal surg ry DR WHILIAMS-2 Call I ladder surgery

DR Aun- Clinic on occupational di ca s calcium metal oh m in I one

1 1 Bock - Surgi al clinic DR HARMER- Surgi al clinic

PETER BENT BRICHAM HOSPITAL We day

HARVEY CUSHING- 30 \ uro urgical clinic

FRANCIS NEWTON-3 30 Die rticulitis CHANNES FROTHINGHAM-4 Lassin, of the chronic

appendi.

F S FMERY JR -4 30 Study of the re-ult of medical and surgical tr atm nt of p ptic ulcer

Tie das

Staff-0 30 Surgi al operations H A CHRI TIAN- 30 Medical diagno tic and thera peutic clinic

GILDERT HORRIN 330 Cordotomy for the relief of pain
J P O HARE 4 Hypertension and nephriti in relation to surgers

DAVID CHEEVER-4 30 Surg cal diagnostic clinic

II ednesday

Staff-0 30 Suracal operation M P Sosuan 30 \ ray study of mas ive atelectasis of the Iung

G P GRABFIFLD-3 Effect of dru s on the nitrogen metaboli ra

John Houans—3 30 Treatm at of vance e ulcer
S 4 Levine—4 Heart di ease in surgeri
S B Wolfiel—4 30 Demonstration in urgical pa

thology Thursday

Staff—9 30 Surgical operation
W. C. Qurner—2 30 Surgical clinic
R. H. Firz—3 Insulin in surgical conditions

WILLIAM MURPHY and JOHN POWERS-3 30 Treatment of secondary anæmia by liver diet

HARVEY CUSHING and TRACK PUTNIM-4 Pituitary gland and its influence on growth

CAMBRIDGE HOSPITAL

T sday

Staff-9 General surgical clinics operations and demon stration of ca es Il ed esday

I W SEVER and Γ A FINDLAY-9 Orthopedic chnic operations and demonstration of cases

Friday

Staff-9 General surgical choics operation and demon stration of ca es

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WARREN MUSELM

Open dails from to 4 pm

Demon trations by DR M CANNAN Curator Dwight collection of pines illu trating deformiti

anomalies di ea e

Bone tumors with \ ray histori s and micro copic lides and micro copes available for examination. Some of these specimens were u ed in the illu tration in the monograph on Bone Sarcoma is ued by the Am rican

Colle t of Surgeon Models howing various types of club fe t and eff ct of

The pictures in Dr Nichol collection illustration

pathological conditions of bone Fractures and di locations of bones a th v exited before industrial plants provided o many af guard Tuberculo is of bones and joint

Syphili of bones Di location of ends of bone

slides)

Collection of old urgical in trument ob t tri al forcep turn key for extracting teeth urologial tool cupping and I eclaine in trument

CARNI I HOSPITAL

Monday

A R Mac Austin Dry clini Tr umatic injuri of the hip joint illu trated

H G LEE - Dry clinic I ra tures of the f moral haft and of the table of tibia were t joint arthrop la ti

D F MAHONEY - Dry clinic Radi al perati n f r carcinoma of the breat and perforating duod nal ul er with pr entation of cases

T sd 1

F B LUND & McK TRISER and a oci t -9 Sur cal operations

W Joinson I E PHANELF and ociat -o Gyn colom al and ob tetrical operation

A L Brett- Dry chnic Ununited fractur of neck of femur hone crews in fractures fu ion of 1 in F B Lind E J Driving and W F Brownt—

chine Chronic duodenal ulcer F W JOHN ON Dry clinic End cult f llo

interposition operation for uterine p olap e (lant m

Il ednesday

D F MARONES W E BROWNE and as ociates-9

General surgical operations
W Johnson L W Phaneur and associates—9 Gynecological and ob tetrical operations

P \ JEPSON-2 Dry clinic Relative value of various types of operative bone plintin including the massive bore graft treatment of chronic arthritis of the pine operative and nonoperati e incid nee recog nition and treatment of spondylolithesis over correction of deformities in fractures

A Mck Fraser-2 Dry clinic Cocostomy in acute appendicitis with peritoniti pre entation of ca es

L E PHANEUF-2 Dry clinic The low or cervical cæ arean section (lantern slides)

Thu sday

F B LUND \ VICK FRASER and associates-9 General surgical operations

F W JOHNSON L E PHANEUF and as ociates-9 Gyne cological and ob tetrical operations

W R MACAUSLAND-2 Dry clinic Mobilization of the knee and elbow

M H BLOOMBERC-2 Dry clinic Scoliosis and club foot E J DENNIG-2 Dry clinic Postoperative medical

problem pre-operative treatment in cardiac cases

L F PHANELF— Dry clinic Uterina bleeding (lantern slides)

Friday

D Γ MAHONEY W Γ BROWNE and as ociates—q. General surgi al operations

W JOHNSON L L PHANELE and associates-9 Gynecological and obstetrical operations

A SARCENT and B A GODVIN— Orthopedic clinic E J DENNIG— Dry clinic Inte tinal parasites in

immi rants U E Browse− Dry clinic Fractures and injuries of the hand and forearm with pre entation of pecial

I E I HANEUF- Dry clinic Appendiciti and pr g nancs

LONG ISLAND HOSPITAL

Mo iday J II CENNIGHAM and C S SWAN- Cenito urinary clinic operation and demonstration of cases

I WRENCE W SMITH— Pathological d monstration III \R\ \ IFT - \euro urgical case

1 B MacMillan \ ray demonstration

II ednesday

P BERT SOUTTER- Orthopedic clinic operations and demonstration of ca es traction in the treatment of fracture treatment of congenital hip LAWRENCE SHITH-2 I atholo ical demonstration

HENRY VIET -2 Youro urgical cases A B MacMillan— A ray demon tration Charles Lend—2 Injection treatment of varico e eins

operations and demonstration of ca es

Fr day

I II CENTRGUM and C S SWAN- Genito urinary operation

l obert Southff—2 Orthopedic operations
Charles I t No— Ceneral surgical operation
LAMPT CE Surm— Pathological d monstration
HENN VIETS— Curo urgical cases

\ B \Mac\line\mathreal_2 \ ray\ demonstration

CLINICS ON INDUSTRIAL SURGERY

At these clinics to be held in the office of the Medical D ector of the \merican \lutual I tabil ty In urance Company cases will be shown to illustrate diagno is treatment and end t ult

T tesday

ERREST \ CODUN-2 Shoulder injuries
LDWARD L \ lot \ S-4 Ingu nal pain without herma

Il ednesday

P D WILSON-2 Fractures of the os calcis injuries to the knee

RUDOLPH JACOBY - Industrial dermatology

TI sday

FRED I COTTO -- Reconstruction surgery in industry IOHN D ADAM -- Injuries to the back

F day

IOHN D HODGSON-2 Fractures of the skull HARRY C SOLOMON—3 Industrial neurology
HENRY C MARBLE—4 Hernia

HUNTINGTON MEMORIAL HO PITAL Hedre day- Dry clime-

E. M. DALAND and G. W. TAYLOR, Carcinoma of the Line C. C. Simmon, and C. C. Lindon. Can er of the confuse and buccal muco-a A LELAND and J V MEIC Carcinoma of the write

R B GREENOT GH and C C STANON Varying degree of malienancy in cancer

WILLIAM M SHEDDON and F P HAYDEN (an rof the rectum.

E. M HERMAN and H V KAZANJEAN Can er of the antrum and acce sors inuse

The say - Dry clinics

WILLIAM DUANE and J. C. HUDSON. The mod in N in plant E. V. DALAND and WILLIAM M. SHEDDA N. Car. r. f th

hp G G Suith Cartiroma of the genito un an tra t R B GREENOLGH and C C Stun \ (an moma t the

hrea t C Sixxon Mal mant bone tumo

E V DILAND and C C LEND HI tro carulat a n th treatm rt of mal mant disea

CHILDREN'S HOSPITAL

M nd v

A H FREIBERC and H J Firz IM o - T t oll conf ren e followed by op ration

F DICK ON ar I R SOUTHER- (" rital d lo att ? of h p conference followed b 1 and redu t n nd helf operation

Tu si

Stall-o General urrical op ration foll ed I dr. cli. 1 WILLIAM LADD Hare lip and left palat

C G MIXTER Contractur's and pla to

G D CUTLER and KENNETH BLACKFAN Emp ema and lu "ab e medical a pect

Staff— Orthopedic clinic infantil paral 1 William L. Arcock and I. H. Lettier. Epid in 1 7 occurren e serum treatm nt

S M Fricher Demonstration of apparatu f r pr ven tion of d formit in early ca -Mr. MERRILL Mu cle tra mine

DR STEINDLER and FRANK OBER T ndon tran plants

DR RYERSON HOKE and A T LEGG Stabilizing op ra

A. T LEGG and FRANK OB.R Operation

II ednesday

W E. Land R B O-Good and a social -9 Chai by combined urgical and o thopedi in ces Present policies in the treatment of glandular intra abdominal bon and joint tube ulo

R B O OOD W E Lapp and a social sclini of urmral and orthoped c ervice. O trome htt acut chroni circum ribed Brodi ab-ceepti joints typ of infection and tr atm nt

Tr sdav

ctaff-o Orthoreds clim A. TAYLOR and J W SEVER Ob a trical paraly d mon

DE VON LACKTU CANNON II \ FILTON and G II II BREW YER Spa ti pal

BRONSON CROTHERS and Mr. TRAINOR Muscle training G W W BREWSTER Operation (Stoeffel) Staff— General urgical clinic operation and dry clini
C G Mixter Urmary ob tru tion and infection
William Ladd Kidn's ton

THOMAS LANKS Hernia and unde cended te-ticle C G MINTER and S B WOLBSCH Aidney tumors pathological a pect

Friday

Staff-o General urgical clinic operation and dry clinic WILLIAM LADD P Ion teno :

6 D CUTLER Idiopathic peritopiti ALGE TE THORNDIKE Appendiciti C G MINTER Intu usception WILLIAM LADD Obliteration of bil duct

Staff- Orthopedic clinic 1 PEMBERTON and K B O GOOD Chronic arthriti

demon tration of ca e

DR KLEINBERG and G W W BPENSTER Scolo : demon tration of apparatus and treatment

BOSTON DISPENSARY

Tres av

J in D Apau - Orthopodic operation II I I LI - Lipiod I inj ction MUNICO LADO-Postoperative undire in p lone terro 1

II F Day - Injection to atment of van o e ve as with demon tration of technique cale and pathological

pe imen DAVID DAVE and H F Day - Ga tro-ent ric diag no e d mon trat on of ca e and m thod J EPH IRATT- Importan e of the ph si ian to the

YEAR EXCLUSION HOSPITAL FOR MOVIEN AND CHILDREN

urreon

T resda

tatt-o Cen al um al operation tau-o Oo tetri al chine cre-arean sect on and operative d liven prenatal clini-

Hedn sday

taff-o Gen ral urm all operation nursers and ward wals, with demon tration of unu ual cale prinatal ch i

Tr sday

Staff-o Demon tration of po toperati e case with patholomal preim n and ro ntg nogram border line ca e prenatal chinic

BETH ISRAEL HOSPITAL

WYNY WINTENORE and a so intes-o dail ura al chni...

Urolon al clini... E G CRABTREE-9 dail MARK ROGER -3 dail Orthop-di clini HERMAN BLUNGARD Demon tration in medical re-earch departm nt

TUFTS COLLUGE MEDICAL SCHOOL

Truotty Learn dad D mon tration of preim no illu tratin r ult of t aumati m espe ially cranial and c cbral

SURGERY OF THE EVE CAR NOSE AND THROAT

MASSACHUSETTS EYE AND EAR INFIRMARY

Tu sdav

Otolaryngology

PHILIP HAMMOND-o Simple and radical ma told opera tion

H \ BARNES-o Malignant di eases of the acce sory

sinuses H P Cattill-10 Dry clinic Were gauge I rain from paraffin basket for skin graft of radical ma told

cavity lantern slides of brain cases G H Toney-rr Dry clinic Lateral sinus thrombo i the manom ter test

B FAUNCE-Lipiodol injections in brain ab ce D C Suvru-3 Lipiodol int ctions in lung ab c 3

Ophthalmolo_v

G S DERBY-9 Surgery of the cyc F H VERROEFF Pathology of the cy W B LINCISTER Muscles

W B LACCISTRY Muscles
J H WAITT Slit lamp demonstration
H B C RIEMER T at sac op ration
E B DUTYPHI P inm try
T L TERRI Patholomy of the eye
W H LOWELL Muscles
H B CHANDLEP Tear sac op ration

Staff-2 Dry clinic war I rounds d mon tration of ca es

II ednesday Ophthalmolo_v

DR HOLLOWAY Thyroid cases DR HOLLOWAY Injudic cases
G S Derby Po top rative complications
F II Virricory Interpretation of fundi
A F McMillan Foreign body plus V ray R C CHENEY Prim try Sympo tura-2 Tailur 5 in ophthalmolo 5

Otolaryngology

G H Pointer-9 Mosher Toti lachrymal sac operation F A Stundanto Ton ill ctomy cases di section and snar

G H POIRIER Slud r technique H P CAULL LaForce technique

P E MELTER Pemoval with caut rv snare

A S MACMILLAN-II Dry clinic Demonstration of

D H WALKER-2 Dry clinic Lip r ading and the deaf child

L A SCHALL-3 Dry clinic Pathology of chron c maxil lary sinu itis proj et on of micros opic slides

Tl ursday

Otolaryn olo y

V H KAZANJIAN-9 Plastic operations D C SMYTH-9 Dry clinic Fluoro cope and remot lof m tallic for ign bod es

H P Mo HER-10 Tyhibition of the ophageal instru m nts d monstration of fluoroscopic examination of

the esopharus
A S MACVILLAN-11 Lantern slid demonstrat on of œsophageal cases

DR KIRBY -2 D mon trat on of Baranay tests F E CARLAND-3 Infection of the ubmaxillary gland Onlithalmology

ALTEN GREENWOOD-O Surgery of the eye S Drrby Tye plus internist

H VERHOEFF T sternal disea es
M Caralle Tuberculosis of the eye H Warr Demonstration of Gullstrand lamp

H B CHANDLER Perimetry
C S DERBY and CHENCY—to I ye plus internist
C S DERBY—it Light sen e
H B C Pirwer Fet mal di ca es

H VERBOFFF-Patholo ical demonstration (lan tern slules)

DR Horlows Eve and intra ranial conditions

Friday

Otolary neology

I H KAZANJIN-9 Correction of deformities of the face A H NEANJIN — Correction to accommend to the and nose Instern lide demonstration

If P Mosher—to Punch truel cotomy

S McVillan N ray of thymus (lant m slides)

I G KREAND—II Historical exhibit of laryngeal

in truments

II P CARRIL-2 I antern slide demonstration of signal ections of the car

D H WALLER-3 Lip realing and the deaf clild

Onlithalmology

F H AFRIGETF—O SUTTOTY of the eye
C S DERBY and AVER Verves of the eye
DR SHITH Social work
J H WAITT Uventi

II B C RIFMER Trachoma

B SACHS Perimetry C S DEPRY-10 I revents e oplithalmology

Staff-2 Dry clinic Chronic simpl glaucoma and second ary glau oma diagnosis significance and importance of vision and the remedy choice of operation tr atm nt of a condary glaucoma

CARNEY HOSPITAL

Tuesday

W S I reman-0 Eye operations and demonstration of cas s \ ray localization and magnet extraction of Ior ion bodies II ed tesday

L D HURLEY and W S LIEBUN-9 Eve operations and demonstration of cases

Tlursday

W S LIEBMAN and H BORNCHOFF-9 I've operations and demonstration of cases

I idav

W I SHEERA and F G MINITER-2 Otolaryngological chnic

BETH ISRAEL HOSPITAL

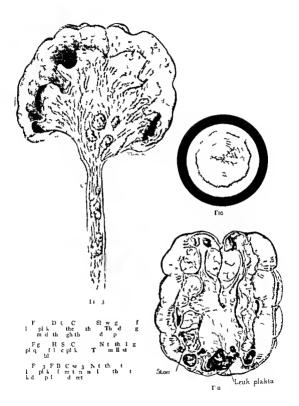
I. V FRIEDMAN and L ARMIN-o daily No e and throat clime

CAMBRIDGE HOSPITAL

N S BACON and E J BUTLER-9 Thursday Nose and throat clinic

I I G Ľ n L H Р H С G I Ι L I О c

LUKENS PICTORIAL ILCHNIQUE BONE AND JOINE SERIES D AVERE BY EVE



Luoplik zofile U rvOg s-H n L Kreis I mer

SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MACAZINE PUBLISHED MONTHLY

VOLUME XLVII

NUMBER 2

LEUCOPIAKIA OL THI URINARI ORGANSI

A KITORT OF THIS ITEN NEW CASES

RY HIRMAN I KRITSCHMIR M.D. IACS CHICAGO F mil P ly 11 11 1R hM ! IC II g

EUCOPLAKIA of the urnary organs has until quite recently received but scant attention in American liter iture. A number of very interesting cases have been reported within the past few years by authors who have very carefully brought the literature up to date. I refer especially to the recent publications by Briggs and Maxwell (um ming Hennessey Hinman Kutzman and Gibson Valentine Wilhelm and Young

Most of these articles deal with the cases in which the condition affected the urining bladder the ureter or the kidney pelvis Leucoplakia of the urethra is not so common at least this is the impression which has been gathered from a more or less casual perusal of the literature.

In two previous publications I reported three cases. In two cases the kidney pelvis was the seat of the disease and in one the urnary bladder and the ureter were involved. Since the publication of these papers articles have appeared in the European literature by Allemann Broglio Cirillo Corsdress Jura Livinghi Pedroso and von Bozza.

In this paper no attempt will be made to review the hterature because this was donc in one of my earlier papers as well as in some of the papers mentioned Hennessev's paper published in January 1927 shows a total of 79 cases reported in the literature. This with the 13 cases which I shall describe makes a

total number of 9 cases which have been reported to date

In 7 cases the bladder was affected in 3 the urethra in 2 the kidney pelvis and in a kidney pelvis and ureter were affected

The various theories regarding the patho genesis have been reviewed so many times in recent publications that they will not be considered in this paper. Those who are interested in the theories as well as in the role played by the presence of tuberculosis chronic infection, and stone may refer to these articles.

SEZ

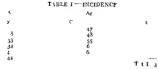
In a previous study of the subject of feucoplakia in which an extensive review of the interature was made we found 34 cases in males 8 cases in females and cases in which the sex was not stated. In the present series there are 9 males and 4 females.

In a recent review of 75 cases Hennessey found that this lesion occurred in the male 56 times and in the female 19 times a ratio of practically 3 to 1. Hinman Kutzman and Gibson in their paper stated that at least in the kidney pulvis the incidence was equal in the two sexes.

AGE

Age probably has no etiological signifince Table I shows the distribution in our nes

Rdtth ulm tgith ben A-oc iC t U yS g ns Whgt Api3 My d 9S



SYMPTOMS

The symptoms of this condition are not In many instances a coexisting nathological condition presents symptoms and signs which predominate the clinical picture the leucoplakia being found at the time of cystoscopic examinations in patient in whom the condition is limited to the bladder or the condition is observed when the kidney having been removed is opened for study thele s many authors mention the passage of large finkes of epithelium as pathognomonic of the presence of leucoplakia Perhaps it might not be amiss to present the most fre quently found symptoms in this series of cases in the form of a table (Table II)

TABLE II -SAIII TOMS n y f t n Bkh Rtt R CI II

Humatu a Pι Pί V mug kp Ьd Ing Ďď 1 lty fw

DACTERIOLOGY

Whether or not infection plays a role in the production of leucoplakia is open to question Here as in the role played by symptoms the question of infection is often secondary or subservient to the underlying primary con dition. In our series the histories show that in 2 cases the urine was sterile and free of in fection whereas in 8 cases infection of one sort or another was present. In 3 cases the cul tures were not stated. In the patients with tuberculosis of the kidney and bladder both showed the presence of tubercle bacult on smear and guinea pig inoculation

One of the interesting phases of the sub ject is the fact that the bacteriological studies of the urine fulled to show the presence of any one organism in all of the cases although bacillus coli either alone or in combination was the most frequent invader This lack of constancy is also evident in the literature I urthermore in some cases the urines were sterile notably in the cases of Cumming and Corsdre's Hinman Kutzman and Gibson found the bacillus proteus. Wilhelmi found staphylococci Hennessey bacillus coli and stiphylococci and Valentine streptococci and gram negative bacilly Tables III and IV show the bacteriological results in our series

TABLE HI -BACTERIOLOGY ηü II La Hambt t rt di d t phyl c 11 dtit St nl N t tat f TABLE IN -URINALYSIS \ll mı Pu Bt Blood

Et th 1 1 II

I I EVIOUS VENELEAL HISTORY

For a time it was suggested that perhaps syphilis was a factor in the production of leucoplakin Among the champions of this viewpoint may be mentioned P odas who believed that leucoplakia in most instances offered a pathology the origin of which could be traced buck to syphilis because specific treatment had proved effective. In our pres ent series a Wassermann te t was made in 9 cases and was positive in 1 case. Neverthe less the present opinion I believe is rather agranst the pos ability of syphilis as an etio loucal factor Gonorrhan too has been held responsible but in my opinion it can be ex cluded The majority of patients in this series demed ever having had gonorrhoea and on examination no evidence of that di ease was found

ASSOCIATED LESIONS

Various authors have from time to time in cluded in their reports the detailed study of coensting lesions. There was a time when it was believed by some that leucoplakin occurred only when associated with stone and hence was due to the presence of stone either directly or indirectly. This viewpoint we now know to be erroneous because leucoplakin may occur in many instances as an independent disease. A review of this series of cases give the results shown in Table V.

TABLE A - ASSOCIATED I ATHOLOGA

Urethra

I Traumatic stricture

- 2 Urethral calcult with ruptur of the ur thra 3 No as occuted pathology
- Bladder
 - I Stone with chronic cystitis

2 Carcinoma with chronic cystitis 3 Ulcerativ cystitis with py lonephritis

4 Tuberculo 1 of the bladder secon lary to renal tuler culosis

5 Chrome cystitis with m dian bar of tru tion (lifted kidney pelvis left)

6 No associated 1 athology (louble ki inc) and 1 ull-

7 No associat d pathology

Ki lney I I enal calculi

2 Renal tuberculosis

3 Hydronephrosis (infected)

CASE 1 D G male aged 44 years The patient s previous history was negative he had had the usual diseases of childhood and denied venereal disease The family history was negative On April 21 1921 while at work on a crane at a cinder pit the patient fell on a steel rail in the pit striking upon the peri There was bleeding from the external urethral orifice and in less than r2 hours complete retention of urine The next morning he was taken to a hospital and the bladder was drained per catheter for 2 days A few days later an abscess formed in the scrotum and was opened and drained A second abscess which opened spontaneously de veloped in the scrotum after the first one healed Until the abscesses were healed the urine was passed through the incision The patient remained in the hospital 5 weeks

After the patient left the hospital he noticed that he did not empty the bladder and was obliged to evert pressure on the perineum with his hands after the act of urnation was apparently completed. The same was true of ejaculation the semen was not ejected at the time of ejaculation but had to be forced out by pressure on the perineum. The sexual act was otherwise normal. Since the accident he had had some tingling in the perineum which was present only during urnation. Urgeney was also present occasionally. There were no other urinary symptoms present.

General physical examination was negative There was a small sear at the penoscrotal junction the

site of the incision for draining the abscess. Some thickness and hardness at the penoscrotal junction was felt. A varicocele was present on the right side. Rectal examination was negative Blood pressure was 122-80 Roentgen ray examination showed a healed fracture of the pelvis Urinalysis gave the following results color clear reaction acid al bumin none no blood sugar casts or red blood cells pus cell rare Cystoscopic examination was negative Urethroscopic examination (Fig r fron tispicce) showed in the bulbous urethra a white dry lusterless area about the size of a bean. The surface was wrinkled almost scaly. The edges were sharply defined and stood out in marked contrast to the normal mucosa. The posterior urethra was negative Exploration of the urethra with a No 27 dignostic sound showed a very firm band at the nenoscrotal juncture

Dingnosis traumatic stricture of the urethra

kucoplakin of the urethra

Cisi 2 J W h male aged 55 years had had mumps and scarlet fever in childhood rheumritism at 43 influenzy at 50 urethritis complicated with bil iteral epididy mitis many years ago. The family history was negative. The patient stated that for the past 2 years he had noticed a lump under the urchar which had been gradually growing larger and had always been hard and firm. Four days be fore coming under observation the swelling evident is ruptured into the urethra as blood was passed Nevertheless the size of the swelling had remained about the same.

During the past vear there had been a good deal of dificulty in urmation which had become more noticeable with the increase in the size of the lump but there had never been complete retention. No catheter had ever been used. The patient urmated ever 2 or 3 hours during the day and 3 or 4 times at might. A week prior to admission to the hospital the patient developed chills and fever which had been present daily since then. He was obliged be cause of apparent obstruction of urine to strain a good deal the force of the stream being practically nil and the urine merely dribbling away. Sexual symptoms were absent.

The patient had had a cataract of the left eve The teeth were in poor condition and the pharing was injected Several glands of the neck were en larged The lungs were negative. The heart showed a mitral murmur transmitted in the axilla Exam mation of the abdomen was negative guinal glands were present on the left side. On the right side was a scar the result of an operation for hernia The external urethral orifice was negative A bard mass was felt at the root of the penis and ex tended back along the urethra almost to the front of the rectum The permeum was swollen and sen sitive and had the appearance of being odematous An attempt was made to pass a urethral sound but an obstruction was met and had a gritty feeling as though the tumor mass were due to stone Reetal examination was negative. Roentgen ray examina

tion showed stones in the urethra. Examination of the blood showed red blood cells 4 736 000 leu cocytes 18 000 hamoglobin of percent Was er mann test as negati e Gonococcus f ation test vas no it ve (a+) Urinalysi shoved c lo turbid odor foul albumin 3+ sugar non sed ment pus and red blood cell

Diagnosi multiple urethral calculi vith unnary

e fra asat on

Operation was pe formed un l r gas anæsthesia on April 15 92 An 1 cisi n as made in the median lin o er the tumor and arri d back on the per neum. A large amount of pus and un e scaped The bulbous urethra vas op ned for 1 ch s and a large stone and se eral small ron s w er mo ed When the urethra vas opened several a eas we se n that yer in direct contact with the stones and were white a didry a dihad the typical appeaance of leucoplakia. These patches were cised for hi tolog al tuly and the dannosis of leucoplak a vas enfi d Th wound was clo ed n the usual manner and drains ere ins reed. The mmediate postoperative convalescence as rath r trying du to infection following the unnury extravasation The yound was irr gated d ilv Culture of pus from the vound sho ed colon bac lls a d taphylococci

On June 18 the wound as clos d an I the pate nt was given permission to lead the houstal During th night he suddenly develop d dyspacea profu rerspi ation bloody sputum as use of vight over th sternum and a v ry p oducts cough Th p tient died on June 19 f pulmo ary embol sm

I erm ssion for an autopsy could not b obtain d Diagnosis ur thral calculi runtu of the ur thra leuconlakia of the urethra pulmona sem

bol m

CASE 3 M ss B M 8 years of age r ferred by Dr W E Post was admitted to the I resbytema Hospit I on May 1921 She h d h d th usual diseases of childh od Her appends had been re moved a year prior to admiss on t the hospital The pat ent compl med of pan in the lo er quad rant of the bdomen which had be n present for o

y a s Par in the bladd r egion for 2 months had been's ere sharp and marked at ur atto

The patt tw sas llow u dernourish d woman of a ery n ous type Her pupils react d to l ght and ac ommodation. The sclera ere pale. E am ination of the ears os throat heart and lung was negat ve The bdom n show d some tender ss in thurght lo r quadr nt ove the colon kne jerks were extrem ly brisk. Felv c exam ation showed the uterus in seco d deg ee retro sion a d not easily lifted Wh n th lips of the ureth wer everted two hite dry dull patches of l uc plakia could be seen. One of these p tubes was lo ted on the floor of the urethr and o on the later I vall Cyst sc pic minat on on May 23 as n gative e cathetenzed s sthout difficulty or The ureters obstruction Exam nation of the urine from the bladder showed bac llus coli that from the & dney staphylococci Ur ne from the left kidney was sterile. The roentgen ray e amination vas negative for stone I yelograms were negative Blood exam mation shoved red blood cells 5 100 00 leuco cvtes 6 00 hamoglobin 66 pront Blood pres sur was oo so The Was ermann test was negative Many specimens of bladder urine were examined and wer negative for tubercle bac lli E amination of catheten ed sp cimens on June 2 shoyed from th bladder t l ucocytes p r cubic mill meter cultures sho ed ba illus coli but no tuberel bacill Ur ne from the right kidney show d a linearytes per cubic millimet r cultur's show d bacilius col but no tub rel bacilli. Un e from the l ft kidnes sho d I ucocytes per cubi mil imeter cultures we e ster le o tuberele bae la vere fou d

Guinea p g t sts on May 24 1024 show d for the bladder specimen a negative result to tuberel bac lli on July 26 923 and June 8 1924 th urine fr m the bla lder and right and left kidney vere

negati c for tubercle bacilli

Diagnos s retro ers on of the ut rus mal utri tion hydrosalpinx I ucoplakia of the ureth a Cast 4 J C male ag d 47 years v as seen through the court sy of Dr Ierry Bromberg ol Va h ll Tenn ss. Th patient was admitted to the St Thomas Hospital at Nash ille on Dec mber 10 02 The family history as n gativ nationt's pre jour hist ry was negative except for an attack of cp didymit's 8 years prior to his admission to the St Ihomas Hospital For the past 1 v ars it had be n d ff cult f th patient to unnate He stat d that the str am was very easy to start and at first flowed fr ly but when the act was abo t half In shed the flow gradually slo ed dow to a I ibbl and finally stopp d He was forced t wait a few econds and then after relaxing as abl to f nish Straining seemed to aggravat the cond tion and at times blood t ged urin vas p ssed When the str am began to slo down he s ffered from a burns g pain over the symphysis high radiated toward the ectum Frequency of urination had been or sent for many year and at the time the pat at pre sted him If fo exam ation he ur nat dev to hour during the ght and r or 12 times dun g th day

I has all ex minat n 1 los i the foll w g Head a d neck wer egate e c cept for th v ry poor co dition of the teeth H art and lung w r negati e E minati n of the abdom sho ed te ding some te derne o er the symphysis p b up; ard about m dway to the umbilious and out a d to the outer b rder f the r tus m cls Tre extern | g mt la ve neg t e except fo the ght t tele h ch va troph The refl ves er normal Fram atton f the urn sh ed specific gra ity of alkaline r action a trac of album no sugar or cast but an occasional red blood ll Phenoln phthal test showed a total output fir per cent for 2 hours The blood unt sho ed 13 0 0 I ucocytes Blood chem stry sho du a 30 ur a nitrog n 18 non prot n mtrogen 25 \ raye m matio sho ed a ten l rg st ne in the bladd r

Operation was performed by H L kretschmer at the St Thomas Hospital Nashwille Tennessee December 12 19 2 (courtes) of Dr Bromberg) Through a supripubic cystotomy a very lirge stone measuring 75 b) 6 b 45 centimeters and weighing 6 ounces was removed. At the time the bladder was opened multiple areas of leucoplakia were found. These were removed surgically and sections were extrining by Dr B 1 Terry of Nashwille who verified the diagnosis of leucoplakia of the bladder leucoplakia of the second control of the second control

CASE 5 R K male aged 62 years referred by Dr R B Ole on was admitted to the I resbyterian Hospital Chicago on March 24 1927 The patient s father died at the age of 72 years of carcinoma of the stomach. His mother died at the age of 49 years of carcinoma of the lungs. The patient had had gonorrhoa at the age of 20 years but this had cleared up without complications Syphilis was de med The patient stated that he had always had more or less bladder trouble. He had had frequency of unnation with burning and nocturia for oyears These symptoms had recently become aggravated so that 11/2 years before coming under observation he noticed that his urine had become turbed and contained a large amount of sediment noticed at that time some discharge at the end of urination Frequency of urination had gradually increased so that he was obliged to urinate about every 40 minutes during the day and about 10 or 15 times during the night Hamatuna Legan about 1/2 years before be came under observation It was most marked at the end of urination. He had had ome deep X ray treatment which he believed in creased the pain frequency and hamaturia

Physical examination showed head neck heart and lungs negative The liver could be felt 2 fingersbreadth under the costal arch The external genitalia were negative Rectal examination showed a normal prostate. The base of the bladder felt as though it were greatly thickened Blood chemistry urea ri 3 uric acid 5 creatinin 155 Wassermann test gave negative results Urinalysis howed reaction alkaline albumin 4+ no sugar blood + pus 4+ sediment red blood cells and motile bacilli A catheterized specimen of bladder urine showed 240 leucocytes per cubic millimeter cultures staphylococcus albus and bacıllus coli Roentgen ray examination was negative for stones in the genito urinary tract Cystoscopic examination under sacral anæsthesia. March 25 showed a large white necrotic tumor mass about the size of an apple extending around the neck as well as around the base of the bladder A great deal of redness of the vesical mucous membrane and some ordema were present A diagnosis of carcinoma of the bladder was made

Operation was advised and on April 1 we did a suprapubic existoromy and applied surgical dia thermy to the tumor mass. The bladder was opened and a very large flat necrotic tumor was seen which extended from the upper part of the bladder down to the urethral ornface to the left side as far over as the base of the bladder. A very large area of leuco plakin was seen on the right side of the bladder base and wall. A small section of the tumor mass was removed for histological study and the tumor was treated extensively with surgical diathermy. A section was removed from the area of leucoplakin for histological study and the area was given a very thorough diathermy treatment. Convalescence was uneventful.

Diagnosis bladder carcinoma leucoplakia of the

CASE 6 Mrs T McD widow aged 44 years referred by Dr E Spiegelberg was admitted to the Presbyterian Hospital December 23 rg 5 She had had measles mumps and scatlet fever during childhood. One sister died of carcinoma of the uterus at the age of 44 years.

About weeks before entering the hospital the patient was suddenly seized with severe pain in the right upper quadrant. This was described as sharp in character. It remained localized and did not radiate The attack lasted for 8 hours The second attack of pain radiated from under the right costal margin to the back. A doctor was called who gave morphine to relieve the pain She had been troubled with noctura for about 20 years. At first the noc turia was infrequent but at the time of admission she was obliged to urinate 3 or 4 times every night Frequency during the day had begun 3 years pre viously and had gradually increased. At the time of examination the patient was obliged to urinate every hours. The pain in the bladder was described as an aching pun It had bothered her for many years but was always relieved by urination. A certain amount of urgency of unnation was asso ciated with this pain

Physical examination showed that the pupils re acted to light and accommodation. The teeth had many crowns Examination of the tonsils neck heart and lungs was negative Examination of the abdomen showed some rigidity and a palpable mass in the right upper quadrant which was tender there was some rigidity on the right side posteriorly The reflexes were normal Examination of the blood showed red blood cells 5 420 000 leucocy tes 19 300 hemoglobin 90 per cent Blood pressure was 104-62 Roentgen ray examination was negative for stones Cysto copic examination on December 6 (under sacral anæsthesia because of extreme irrita bility of the bladder) revealed flakes of pus adhering to the bladder mucous membrane The urcters were normal Cystoscopic examination (sacral anasthe sin January 4 1926) showed considerable redness of the trigone flakes of pus sticking to the trigone the right ureteral orifice gaping the mucous mem brane in the region of the left ureter velvety. Both ureters were catheterized without difficulty or ob struction The urine from the right side was turbed with large flakes of pus The urine from the left side was slightly turbed with specks Urinalysis (ad

m ssion specimen) sho ed alkafin reaction some albumin no sugar no blood som l u ocytes s m bile many epith hal cells a f v leu oc te and many epitals

Examination of eather rise dispecimens firm a sho cell from the bladder good betweet p risube milbimeter no easts cultur sight in the liber blue cab uncertainty of the right kidn viso of dog of the produce milbimeter no easts cultur sight and sulfuse of Ure from the left kines shi and sulfuse of Ure from the left kines shi and sulfuse of Ure from the left kines shi and sulfuse of Ure from the left kines shi and sulfuse of Ure from the left kines shi and sulfuse culture for the left shi and the state of the left kines of the left kines of the left kines of the left kines and sulfuse culture for the left kines of the l

negative for tuberck bill Pelgum hoed no mlkid evs
The patent left the hopital on Januar 6 1, 6 a drium don Januar 5 1, 6 a drium don Januar 5 sheemplained at the time of pain in the right soke foun of unation pain on unnation i eling fill cs after cating vinitig jaund e a dipu the

to 6 from blaid an I right a d l ft k in scre

gastrum. The seamptoms bg nishe tlaft rh

Physical vumnation sh. I that the patints shin and the scle æfth vs cr frello h t. The mass in the right upo q frello mation on January 5 sho ed. d. Ils 3 500 000 leuccytes 5 000 hem globin 80 per nt blood wserman noositie The patients a en by

W sserma n positi e Th patent a en bi Dr Ralph C Bro and Dr D B l h m t r D agnosis Carc oma of th stomach th m ta

ta s in the live

E ploratory operation s do F brua x 8 by Dr I hemi ter and care noma f th stome h the n dules in the le and obsertion t in bildut were found. The put int d don't noma of the yar A atom calding is allower noma of the gill blaller ith xt nsi mit siss to th brace ding c sto ureter pyclophrit 1 c phala

of the urin v bladd r bil t ril hvd o ur ter and hvdroneph osis. The lining of the u mirv blall as a lark g v b o n About th trigo and tend g up to the f dus al g the l t ral. His ther were flat irregular slightly l v t i v b t h p lipabl plaques to 3 or 4 millimet s in d m.

eter Se ral f these small hite pl ques moved for hi tological study

Histologi I diagno s I ucoplaki f th u n bl ld r ad nocare n ma of th g ll bladd

metast s to the l r

"CAE? TM male agd os glrfrlby DP D Leas admitt do thi firsh tr Hospit I Jul 3 to 3 The pat in stated thi the had h d mo or less uri v dst ss for 3 v cosst goff equency bur g 1 d pain on u in a ton also no turn Frquer smor mark 1 tr might than it as du g th day it gradually in creased until he was bligd to vod about cerv 2

hours during the day and night. Hæmitur i b gin nbout 2 years ago and blood had b en pr sent in th unne from time to time. The pat ent thought that p s had been present in the urine practi ally all of the time.

The patient vas a vell developed and v.ll ourshed male. The examination of the h ad neck h art fungs abdomen external genitud a and e t mittes as negative. Several vaminations from the spin l cord less in disclosed negative h din Rectal examination showed a small pr state and the mirgins of the left lobe were had—question the for tub re losis. Blood examination leuc cyte 12-4 hamoglob no ope en 18 Blood the mistry blood sugar 150 urea 55 urea acd 56 c catt in 3 nont protein intogen 60 Uri also showe? I a tion alkalin album n 4+ some Il od n suga no casts sediment leucocytes epith! I c ll pho phitus. The esilual urine amounts aired from 100 to 166 eutor cent meters.

C to c pr examin tron July 17 02; r scal d a larg hit are so fleucoplain are nd the init rail u th alo fic b g ming above a d c tending t th right sid ab ut half was d wn to the b sc E am atto of a c there zed sjec men of urine July sh wed from th bladder & leucocytes per his part of the control of the co

ub m lim tr Cultures vere sterle o cada for tub rd bacifl R pe ted examinations of bladder rn s vr n gat ve for tuberd bacifl R pe ted examinations of bladder rn s vr n gat ve for tubercl bac lli to unea pg cul 1 tons on J li s 2 and r f om th bladd r jost eff r tub cle b cill E amination of cat ried sp m s fr m th 11 dder on August 8

positive f r tub rele bacilli Dig osis leucoplakia of the bladd r renal tu

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The price t died in March out furemia Unitro and a nation vio el dout bo diamed Ca. 8 I M B mile ged 44 years was 14 or 15 or

I be scale mention showed the l d decknegat the tonsils mod atched it get the
fumph glinds in the n k palpable the tilved
nog t the hat ad blug n gitte I amo
tion of the abd mentions neg The et al
urchital off sho ed nour thral dische tige The
vasien Irg mentands met de ness not gitte
the publication.

and tender On rectal examination the margins of the right lobe were easily palpible the margins of the left lobe could not be outlined as they fused with the bony pelvis. The left seminal vesicle was exceedingly hard and broad and scened to be in one mass with the prostate. The right seminal vesicle was soft. Strippings from the prostate showed a few goneococi.

Treatment consisted of baths internal medication and sedatives. The condition remained unimproved and on account of his unfavorable state of health

the patient was sent to the hospital

Blood chemistry December 10 showed urea 105 uric acid 41 creatinin 15 non protein nitrogen 27 8 Blood examination showed red cells 4 300 000 leucocytes 13 250 hemoglobin 80 per cent Blood Wassermann was negative Blood pressure was 138-108 Examination of catheterized bladder urine December 6 showed 70 000 leucocytes per cubic millimeter sterile cultures and no tube rele bacilli Cystoscopy under deep ethylene an esthesia December 7 disclosed a severe generalized evatitis some bleeding from the neck of the bladder the interureteric ligament markedly hypertrophied and at the base of the bladder multiple areas of ulceration and a large median bar Both ureters were catheter ized without difficulty or obstruction Examination of catheterized urines showed from bladder 27 200 leucocytes per cubic millimeter from right kidnes 40 leucocytes per cubic millimeter from left kidney ro leucocytes per cubic millimeter Smears showed no organisms cultures were sterile Pyclograms showed a bifid pelvis of the left kidney the lower end of the ureter dilated and the right kidney

After failure to obtain relief through the usual forms of treatment a suprapuble cystotomy was performed on December 14. The bladder wall was found to be exceedingly thick. The mucous mem brane over the trigone was markedly hypertrophied thick and granular. Around the neck of the bladder was seen an area of ulceration which completely surrounded the internal urchral orifice and bled very easily. The bladder neck was exceedingly tight and a definite median bar was seen. On the posterior wall there was an ulcer about 2½ inches long. On the posterior wall 2 white areas of leucoplakia were found.

Diagnosis median bar hypertrophy with contracture of the internal urethral orifice ulcerative c) stitis leucoplakia of the bladder and bifid kidney pelvis (left)

CAST of Mrs R S aged 53 years referred by Dr D B Phemister was admitted to the Presby tenan Hospital January 7 1926 The family history was negative The patient had been married of years and had never been pregnant Eleven years before admission to the hospital the patient had begun to have frequency of unnation associated with marked urgency and some incontinence. The condition remained about the same and several years later she begun to notice that some of the unne

appeared cloudy Passage of urine was accomputed with a burning sensation. For this she had been treated with bladder lavage for 2 or 3 years and the condition had improved somewhat. The pun in the left renal "rest started in 1923. It radiated along the course of the left ureter was sharp and cutting and interfered with the patients sleep. She was obliged to urinite every 10 or 15 minutes during the day and 4 or 5 times at hight sometimes more often than this

Physical examination of the head mech heart lungs and abdomen was negative Blood examination showed leucocytes 11 100 hamoglobin 88 per cent Blood pressure was 104-70 Roentgen 120 examination was negative for stones. Urinalysis showed acid reaction albumin 3+ no sugar blood 3+ pus 2+ Thalen test showed an output of 55 per cent in 1/2 hours. Time of appearance was simpulses.

Cystoscopic examination Tanuary 28 10 6 showed a large dull white wedge shaped area about the size of a silver dollar extending from in front of the air bubble above to or nearly to the internal urethral orifice below. The margins of the mucous membrane of the bladder were hyperemic. A similar area was seen on the trigone in front of the right ureteral orifice The ureters were catheterized with out difficulty or obstruction Examination of the eatheterized specimens of urine showed from he bladder 1240 leucocytes per cubic millimeter Cultures showed bacillus coli but no tuberele bacilli were found. Urine from the right kidney showed 5 leucocy tes per cubic millimeter Cultures showed bacillus coli and streptococcus hemolyticus but no tuberele bacilli. Urine from the left kidney showed 5 leucocy tes per cubic millimeter Cultures showed bacillus coli but no tuberele bacilli. Guinea pig inoculations of urine from the bladder and the right and left kidney were negative for tuberele bacıllı

Cystoscopic examination Tebruary 2 verified the findings of the first examination. At this time how ever two unterail openings were found on the left side one of which had been overlooked at the first systoscopic examination. The two left ureters were catheterized with the following results from the lower left kidney no leucocytes sterile cultures no tubercle bacilli from the upper left kidney. I cu cocyte per cube millimeter sterile culture no tubercle bacilli. Guinea pig inoculation February i showed that urine from lower left kidney and upper left kidney were negative for tubercle bacilli. A pyelogram showed a double kidney pelvis and double ureters on the left side.

Diagnosis Leucoplakia of the bladder double

Lidney pelvis and double ureters (left)

CASE TO Mr C W aged 48 years referred by Dr W E Post was admitted to the Presby ternan Hospital November 30 1923. The previous history was negative except for a gonorrheeal infection 20 years prior to examination. One year ago the patient consulted a physician for so called rheum.

tem. He as told that the rheumatism was due to an infecte I div resculum of the bladder. In June 10 3 the di erticulum as removed an I the rhen mati m impro id After the operation the patient as t oubled with frequency of unnation which gave him a good deal of distress. At times he as of lived to void evity 15 minutes during the div and 3 tim 5 at n ht He also note d hematuma and stat d that before the operation he h in yer's en blood n the urin Burning a d smarting at the beginning n lend of urination wir assign tid ith freque cv an I hamatur a and extend d fr m the tp f th p u to th anus He h l b en unable to vork mu h since the operation on ac ount of H had I st about 15 po n is n ei ht H al omplued of rheumiti p ns in the hp knees back and hould s

This cil vamination of the head an ! neck i as n gat e I us was fou d in both t n il The heart and lug er ngative The bdomnshid a car ab we the symphys's pubis but wa other v sc negat e L amination of the ext rnal gen talia was n gati e Rectal examinat on d sclosed a very large hard and firm pro tat Mas ag v pr seed pus and ultures fit sho ed strepto cci orsdalume as found Blood ami ation hoved red cells 5 346 000 1 co ytes 6 600 Blood pr s ure as 00 7 The blood Was ermann test was n gati Roentgen ray va minut on f the te th sho dap al ab s ih ge ito uri nary examination as negat of ston's The urine as turbil Spe in graity as 12 r ctio alkaline alb min pr nt some blod but no sugar was p nt Th s l ment co si ted of pus an lepith lal ells Cystoscope am ation D mber 7 sh v d tvo area of l ucoplakia on the anter r wall and on the left lateral vall and a m lerate amount of cast tis Both ur ters a re c theterized thout difficulty or ob truction Exam n to of the cathete ized spec men of blad ler ur ne sho ed bacill col: Sm a s made from the as o s mate all obtained at the time of the cisto s pce m atinsh ed o t berel bac lli or other orga ism E aminat on of the catheterized cim us of ine f om the bl dder ho ed 5 o le ocyt s p cub c m lhmet r no e from the r he k in v an l 4 fr m th left kil ey Cultu es made from the ine of the bladder and I ft kidney sho d trept o ci Uri from the right Lidnes vas st r! Repeated vaminations of the u me neg ti e f tub r le bacilli Guinea pig norulations January 9 to 4 were negati

now the first breith country meg the first breith country meg to the relationship of t

A lingu s of leucoplak a vis m de vith the urethroscope and vis verifi d by the histological e aminatio f s tion

Case II I O B female ag d 34 years married as admitted to the I resbyteman Hospital April 14 1926 She had two children livi g and well Sh had had the usual diseases of childhood. Her father die I of cardiorenal d sease at the age of 74 years her mother die l of a paralytic stroke at the age of sa years other use the family history was neg ti e The present illness began a year ago when the pa tient noticed burning on urination just b fore the act as finished Th burning a creased in se enty so that at the tim of exam nation it vas conti your For this she had had some treatment which failed to giv reh f Frequency of urination began with the bur ing It times she urinated every 3 mi ut s at easier per ods every 2 to 4 hours She had had to urs at at night for the p st 2 years the first year O c of twice during the night the second year 2 or 4 times a night Urgency had been p esent for a s ar and when desire came she had to respond m me hat Is About 10 months ago she noticed blood at the end of each urination. The uri e was dark therefore the blood must have b en fresh. No such manifestation had be n seen since

Pluscal examination showed a very pal under nourished oman Tonais had been remo ed but p t of the right one remained. The mucosa of the mouth as pal and the gums bled east by The he d neck heart and ings examination was negate bonner gudity and tenders as were found in the right upp r quadrant. The lift kidney and plen vere not prilaphle. Ar gid mass col blo fit is the right flash. Rectal exam atton wis ne tive Vagin lexamination showed in enda gid ut r us n thand degree reto rison. Blood examination with the standard process of the standard process of

Exam ation of cathet rized bladder urine shoved 16 I leucocy tes per c bic m il meter bacillus c li but no tubercle bacilli. Thalein test sho ed the time of app arance to be 5 minutes the first 1 minut a 35 per ent second 30 minutes o per cent third 30 m nutes 5 per cent 1 bours 6 per c nt Roentg n ray exam nation of the che't was n gate e Cystoscopic e amination Ap l 14 sho d bl dder capac ty lim ted right ur te al oraf ce normal 1 it ureteral orance retr ct d To the r ght of the left ur teral ornice appeared an r a of ulc ration The right side was cath teriz d but it a impossibl to c theterize the left si! Exam nation of c theter ed specimens f un c sho ed from the bl d ler 8 000 leucocytes per cubi milh ter fr m th right kid y 2 I ucocyte pe cubic in llumeter no c ts no orga sms on gram mear trike ltures tube cle bacille T berele b calls re found n the e m ation of centrifuged blallrun on April 15 Gun pg 1 ocul tio April 4 fr m the bladder was positi e for tub rel

bacilli from the right kidner negative for tubercle breilli. Guinea pig inoculation. April 6 of urine from bladder was positive for tubercle bacilli

from right kidney negative

Operation April 20 left nephrectomy. The kidney showed two large above sed crysties filled with pus. These were about 3 centimeters in diameter. In the pelvis at the level of the middle calve w is an irrer of leucopalvia about centimeters in diameter. The epithelium scaled in thin white ilste. At the junction of the lower and middle third w is an areo of multiple tuberels formation extending from the pelvis clear through to the outer side of the kidney. The urter was diated and thickned. The urteral mucous membrane was studded with miliary tubercles. The abscissed crysties were rigid and thickned and uneventiled convalisations and was discharged from the hospital. May 11 19 6

Diagnosis tuberculosis of the left killner ha

eoplakia of the left kidney pelvis

Case t H S male aged 41 years single fatient was seen at the United States Veterans Hospital No. 66 January 30 to 3 He had been operated upon some time previously for multiple calculi of the urethra. Veneral disease was deined bout 5 years before coming under observation being an to complain of frequency of unration burning tenesmus and turbid urine containing flakes. The condition remained unchanged for about 2 years. Some relief was obtained with bladder irrigations. He had pas ed blood in the urine which he said looked like old clots.

Whout 3 years before coming under observation he began to have definite examp like pains in the left loin and flank much burning frequency noctura and tenesmus. Two years ago he was unable to pass more thin a few drops of unne at a time and this condition persisted for 5 days. On examination a large calculus was found in the anterior urethra and later two more were found in the posterior unterham and two in the bladder. The e were removed

surgically

Frequency of urmation had been present for 4 years. He was obliged to urmate every 1/hours during the day and 3 times it night. He stated that the urne had been cloudy for the pist 5 years and had never wholly cleared up. Finn had been present in the left loin and flank daily for 4 months never extending below the umbilicus. It began about 3 a m and persisted until the patient got up

Physical examination showed that the pupil reacted to light and accommodation. Tonsils were small. Teeth were in good repair. The examination of the neck, and lungs was negative. The apex was inside of the mpple line. A slight systolic thirll was heard or the apex and accentuation of the eo ond sound. Examination of the abdomen external genitalia and rectum was negative. Blood chemistry, showed urea nitrogen 60 unic acid. 2 creation 15 Blood pressure was 118-8. The Wassermann test was negative. Rontigen ray examination of the abdomen extension of the state o

inition showed a shadow in the region of the left kidnes compatible with stone The urine was straw color specific gravity to o

The urine was straw color specific gravite to o some albumin and some blood no sugar sediment pus 3+ red blood cells 3+ triple phosphates. That is the triple phosphates to the color of appearance 6 minutes first 30 minutes 15 per cent total 1 hour o per cent from the left side time of appearance frint in 6 minutes first 30 minutes 5 per cent second 30 minutes 6 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 0 total 1 hour 5 per cent second 30 minutes 10 minutes 1

Cystoseopic examination lebruary 19 showed a mild generalized eystitis. The ureters were cath eterized without difficulty or obstruction urine was obtained from the right ureter and thick foul urine from the left ureter Framination of the urine obtained at the time of the exstoscopic examination showed the following from the bladder and left kidney many pus eells from the right kid nex occasional pus cells. Cultures from the bladder and right kidney showed bacillus coli from the left kidney sterile cultures. Albumin was present in all specimens and also red blood cells, the right kidney showing 3+ All specimens were negative for tuberele bacilli Thalein test on March 3 showed 17 per cent the first hour 20 per cent the second hour 37 per cent total for 2 hours I velograms of the right side showed a normal condition. The left side showed dilutation of the ureter. The kidney pelvis was normal in size but atypical in shape The calvees were enlarged and irregular in outline

Operation March 27 left nephreetomy kidney showed much retraction and sear formation The perinephritic fat was dense and adherent About three fourths inch below the lower border of the kidney there was a stricture of the ureter above which the pelvis was dilated. In the ower pole of the kidney was a large envity which contained a single stone (Fig 2 frontispiece) The pelvis and lower pole were filled with a very large stone. The mucous membrane of the pelvis was red swollen and ordematous smooth and glistening and showed many small granular spots standing out in marked contrast to the mucous membrane of the superior calyces and lower part of the pelvis. This section of the mucous membrane had a dull china white color It was smooth without luster and appeared very dull and extended to but not into the large cavity from which the stone was removed Convalescence after the operation was uneventful

Diagnosis stricture of the ureter hydronephrosis (infected) stone in the kidney leucoplakia of the

kidney pelvis

CASE 13 F D B male aged 61 years re ferred by Dr D B Phemister was admitted to the I resbyterin Hospital January 18 1925 The family history was negative. Six weeks before coming to the hospital the patient had had all of his teeth extracted on account of infection. The patient stated that his present illness begin about 35 years ago at which time he had a severe attack of

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Drig osis hylr phro is (inf t l) leucoplakia of the kilney pelvis lutr Th pati t m l n un ventful re ov ry anl

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SUMMIRY

I Leucoplakia of the urinary organs probably occurs more frequently than we believe

Leucoplakia may occur in association with various le ions of the urinary tract such as tone infection and tuberculosi or it may be the only lesion present

3 As various types of organi ms have been found in cases of leucoplakin it has not as yet been determined what relation if any exists between the condition and the organism found

4 In this series there were twice as many males as females

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I CONSIDERATION OF CERTAIN DERANGEMENTS OF THE KYEE JOINT

BY MANNEL HARBIN MD TACS CIEVELAND ORIO Fmh D patm f g y fth Lakes I floor t I d h West m Res ts 5 had f Med

ISTURB INCLES in the function of the knee joint are becoming more fre quent and accumulating expenence allows us to recognize the e disabilities earlier and to offer in most case definite favorable therapy. The following report of a variety of the e conditions is pre ented in the hope that those cases which may be given beneficial therapy will no longer remain in the group of chronic permanent di abilities to which

some of them have been relegated

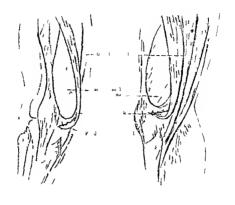
The incidence of certain durangements is largely dependent upon the ocial environ ment as for example the industrial hazards or the type of athletics common to the com munity In England where football is a more open game displacement and laceration of the semilunar cartilage is more common than in this country. In our larger centers automobile traffic has almo t transformed the streets into helds for athletic prowess. The thrust of the humpers of cars against the legs of pedestrians 15 producing an increasing number of lacera tions of lig ments about the knee joint which may be complicated by dislocation or fracture of the cartilages Inadequate treatment of these acute cases results in chronic disability referable to the joint This paper chiefly con cerns the management of the e acute cases

In the minds not only of the laity but of too great a number of pby sicians there is the mis conception that limitation of motion or stiff ness frequently follows operations of any type upon the Lnee joint Sir Arthur Keith states in his foreword to Fisher's (1) book entitled Internal Derangements of the Knee Joint lay mind still harbors the belief that there are certain disorders of the human body and in this number internal derangements of the knee Joint must be included which can be cured only by the application of a manipulative form of magic There is only one form of curative magic-the application of measures founded on an accurate knowledge of strue ture function and disea e

The term internal derangement of the knee joint was first used by William Hey (1803) in his book Practical Observations in Surgery chapter VI Prior to Hey's con ideration such disturbances of the knee joint were known to Hippocrates When Hippoc rates states The bones of the knee are frequently dislocated but they are casily re duced for no great inflammation follows one is led to believe that he must certainly refer to the same disturbance as Hey using the term dislocation instead of internal Quoting from Fisher (1) derangement Hippocrates also says The reduction in the e cases is not difficult but in the disloca tions inward and outward the patient should be placed in a low seat and the thigh should be elevated though not much extension for the most part is sufficient ex tension being made at the leg and counter extension at the thigh

Hey states the joint of the knee is so firmly supported on all sides by tendinous and ligamentous substances that the bones of the thigh and leg are very rarely separated from each other so as to form a dislocation in the common sense of the term yet this joint is not infrequently affected with an internal de rangement of its component parts and that sometimes in consequence of trifling accidents the disease is indeed now and then removed as suddenly as it is produced by the natural motions of the joint without surgical assist anee hut it may remain for weeks or months and will then become a serious misfortune as it eauses a considerable degree of lameness He further states that he is unfamiliar with any previous description of this disease or remedy and then proceeds to give the history and treatment of several cases. True dislocation of the knee is a rare condition and infrequently encountered even in our present day of industrial hazards and automobiles

Vesalius refers to them as insignificant aecidents while Mever of Zurich elucidated



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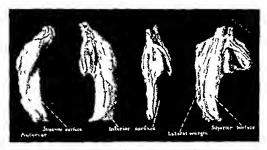
clearly the anatomy and mechanism of the disturbance emph isizing particularly the importance of the rotation of the tibia inward and outward around an oblique rusupon commencement of flexion and termination of extension and also how the condyles of the femur rolled upon the curved yielding body of the semilulur cartilage.

Thomas Annadale in 1885 wa the first surgeon to operate upon a pattent with did turbance of the semilunar cartilage. He utured a torn anterior end of an internal emilunar cartilage to its ori, inal site with an excellent result. The results gained in this cae suggested the possibility for relief of derangements of the knee joint by surgical methods and at the same time revealed the pathology which was re ponsible.

Three hundred years previously Ambroise Pare had successfully removed a loose body or stone from the knee which was classified by him as a mon trosity so that he doubtless had little conception a to the patholo s of such dies es

Attender Month and John Hunter have both offered theories to explain the presence of look both the former believing them to be derived from the articular end of the bone while the latter felt they resulted from unab orbed extravalations of blood into the joint following, injury. Sir James laget ugested the theory of quiet necrosale the coloring of injuried cartilage, with a tile influmination.

There is little evidence to support the theories of Monro and Hunter. Koelliker dico ered cartilage cell in the synovial villiand E. Rames, evolved the theory of loose bodies produced from this tissue. Sunf and O good (o) report that Monro Hunter and Koelliker between them traced out the three main sources of loose bodies. Koem considered the majority were detached by a dissecting operation.



II. 2 Case 3 Internal semilunar til r cartilace of the left knee which illustrates the di placement of the po teri r cornua with the formation of a l'ulbe us tip

William Hey also considered the surfical removal of loose cartilaginous substinces from the knee joint. He says although it has often been attended with success yet as the late. Medical Society has observed it has sometimes been followed with violent in flammation fever and death itself. It would therefore be of service to mankind could a method be invented of curing this disorder with safety or rendering it of no inconvenience to the patient.

The expressed desire of H(s) has been completely realized in our present day surgery. This bele noire was a justifiable one during the pre antiseptic era but not so today.

The hazard of joint sepsis retarded the development of surgery of the knee joint for many years until we find Herbert Allingham (1889) insisted to the profession that with careful antiseptic technique operations on the knee joint are as safe as procedures upon the peritoneal cavity

CASE I No 110/64 Complete Inceration of the unternal lateral ligament and posterior capsule of the right knee joint lateral mobility of 30 degrees surgical repair 48 hours post trainmatic with return of normal function

A male steel worker 28 years of age was admitted to the Lakeside Hospital December 19 19 5 with the complaint of pain in the right knee Thrity imputes before admission to the Accident Ward his right lower thigh was struck by the bumper of an authority of the thright through the bumper of an authority of the pain in the Upon an attempt to use the right leg the pain in the

knee was so severe that he could not walk. The past history was essentially unimportant

The physical examination revealed a well devel oped adult male. The heart lungs and abdomen were normal. There were minor lacerations over the fa e A small abrasion in the neighborhood of the lateral side of the right knee was noted. There was slight swelling of the part and a small area of ecchy mosis along the medial aspect just beneath the condule of the tibia I alpation revealed an area of tenderness on the medial side in the neighborhood of the tuberosity of the tibia. The patella was not ballottable and passive flexion and extension at the knee could be carried out with only slight pain Lateral mobility of 30 degrees was present. In the extreme position it caused considerable pain and with the knee flexed to go degrees the tibia could be displaced forward to a moderate degree without any backward displacement. A roentgenogram of the right knee should no evidence of fracture

The urine upon six examinations was normal. The kucocytes ranged between 0,200 and 11,800. The

blood Wassermann was negative.

In view of the findings of the abnormal lateral range of mobility at the knee joint a suture of the part was indicated. The part was cleaned with soap water and alcohol and a sterile dressing applied. 4 hours before operation. Under gas ovegen either anæsthesis the skin over the right knee was cleansed in the usual manner with alcohol and bichloride and a linear incision 6 inches in length was made over the internal aspect of the knee. It was carried down to the fascial insertion of the sattorius which showed a

the fascial insertion of the sartorius which showed a complete transverse tear in the fascial and the internal lateral ligament tog ther with a portion of the posterior capsule (Fig. 1). The tear extended into the kine; joint involving about reentimeter of the lateral synovial membrane. The attachment of the sartorius muscle was completely avulsed and the distal portion was folded back between the condyle



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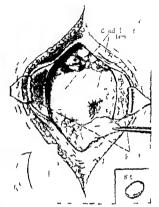
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small hematoma present the attachment of the sartorius was torn the upper portion rested about one inch above its insertion. A complete transverse tear of the internal lateral ligament was present and the attachment of the lateral portion of the internal semilianar cartilage was severely lacerated. The cartilage was severely lacerated. The cartilage was excised and the internal lateral ligament was approximated and sutured with No mattress chromic eatgut. The sartorius was sutured with interrupted No 1 chromic catgut. The kg wis encased in a plaster cylinder from toes to groin with 15 degrees flewon at the knee.

The patient made a normal postoperative consulescence the maximum rise of temperature of curred on the first day after admission reaching 30 degrees C. On the third day after operation it reached the same point and descended to normal within 10 days. The wound healed per primam a moderate amount of serum accumulated in the joint and was aspirated at 10 days and weeks after the

operation

Physiotherapy consisting of baking and massage was begun to days after operation and active motion in the knee was started at the end of 2 weeks. Three weeks after operation the patient was allowed to walk with the use of crutches and he was discharged from the hospital August 30 1927 Complete weight bearing was allowed at the end of 6 weeks after the operation At the expiration of months examina tion of the knee showed 120 degrees of motion There was moderate thickening of the periarticular portion of the internal aspect at the right knee with about 5 degrees increase in lateral mobility of the right leg as contrasted with the left extension was complete and flexion was limited 30 degrees Three months after operation motion was normal the knee stable and the patient had returned to his former

The first case mentioned was among the carly ones when the fear of an insufficiently long period of fixation dominated our be havior. However as more of these cases were treated by surgical restitution, we began to change our point of view feeling that soft tissues around the knee joint, when properly handled should heal as rapidly as elsewhere

It has been the custom to apply a plaster cylinder from the toes to the groin with the knee flexed 1, degrees for a period of 20 days then a Cabot posterior wire splint for another 10 days. Physiotherapy has been commenced to days after operation and active motion without weight bearing 2 weeks after operation under theguidance of a trained physiotherapist. The splint has been discarded at the end of 3 weeks wilking with the aid of crutches has been begun at this time gradually



In 6 (left) Ca e (I centgene ram of the right kn e j int which illustrates typical arthritic change t gether with irregular dense shadows of the lose bodies in the suprapartellar jouch

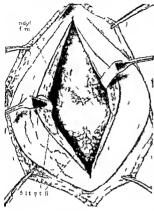
The 7 Ca e 6 Poentgenogram f the right knee joint shiwing a large hypertrophic pur upon the superior margin of the 1 till and the sha lows of loose bodies in the suprapatellar pouch

increasing weight bearing until 6 weeks when walking without crutches or apparatus has been allowed. This regime represents a much earlier return to work than our former one of more prolonged fixation and convalescent splinting with a Jones eage knee splint all of which produced an extreme degree of muscle atrophy and to a tremendous degree defeated our aim of a stable weight bearing member. This very important factor is so frequently lost sight of that one cannot refrain from emphasizing it

The second case is a more recent one and demonstrates an earlier return of function with much less economic loss to the patient

and to his employer

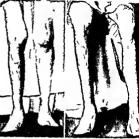
These cases are excellent examples of what can happen following an acute sudden thrust against the lower thigh when the fulcrum is quite close to the knee joint. Although other cases similar in character with the same result might be cited these were considered typical. The pathology demonstrated at operation impresses one with the great importance of immediate apposition of the damiged structures. It is unfortunate that surgical text books in particular orthopedic ones either fail to mention the treatment of this disturbance or suggest that a splint be worn for a



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fortnight and the patient should deviate his body weight from the ligament by walking with his toe turned in—if the measures mentioned fail to restore stability the reconstruction of the injured ligament should be considered ()

The important factor at the out et of such a problem is individualization if a patient has an injury of the part which has resulted in nothing other than fluid in the joint without an increased range of lateral mobility a short period of rest followed by physiotherapy will suffice but when the range of mobility is increased 15 degrees over that of the other knee (and this compan on is important be can e of the tremendous individual variation in the range of lateral mobility) there is necessarily a evere laceration of the ligament if not a complete tear. It is impossible to lay down any hard and fast rule but it would ap pear in general that such an increase in range of mobility usually is the result of a complete



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tear of the structure. When the occurs there is the possibility of interposition of fat or of the fascial insertion of the sartorius as in the previously mentioned ca e which may prevent nature's producing a sound union. Further there may be damage to the semilunar cartilage which at an early period after injury can only be determined by visualization. This latter disturbance is perhaps of less importance than a knee with abnormal lateral mobility requir ing a late reconstruction which at best rarely sives a result so satisfactory a immediate approximation of the torn structures Rupture or tear of the crucial licaments has rarel accompanied the cases which we have en countered There has been no anterior of posterior displacement of the tibia except in Case 1 where a severe laceration of the po te rior cap ule occurred and permitted moderate interior displacement of the tibia A majority of the damaged rucial heaments seem to produce no disturbance in function provided that before the part is placed at rest no ob struction to complete flexion and extension i present

MacGuire (4) follo ing the dissection of several fresh knee joints found that after severing the interior crucial ligament hyper extension was definitely limited by the lateral ligaments and posterior crisule. Therefore in the presence of a laceration of the internal lateral and anterior crucial ligaments an early complete repair of the internal lateral ligament produces a stable joint.

We have recently been able to compare the results of four cases treated by immediate suture with a like number subjected to late suture after the patient had walked upon the part for some months. Uniformly there was

greater stability in the former group

It is unfortunate that so many surgeons still feel that the endothelial cells of the sy novial membrane have less power to withstand and combat bacteria than have the cells of the pentoneum or pleura. This fear of sepsis by the surgeons has too frequently turned the balance against the patients receiving ade quate and rational therapy.

Moorhead (5) reports a series of 49 cases of arthrotomy for internal derangements of the knee joint with primary union in all cases without stiffness of the joint after operation During the past 33 cars we have operated upon 15 cases of the same type with the same result Moorhead says further Certainly no one could ever accuse the profession of having erred upon the side of too frequent surgery of the knee joint as has been the case in many other conditions—it might even safely be said that there has been too great conservatism and the patients have suffered the mistake through lack of education of the medical profession

In view of the increasing number of these acute joint derangements we should begin to analyze the results of various types of treat ment There has been too great a tendency to resort to mere fixation of the part over a prolonged period without appreciation of the handicaps which have been placed in nature s way of producing a restoration of the lacerated tissues Those who do not favor immediate suture have contended that the ligament is usually shredded so that adequate approxima tion and anchorage of the sutures cannot be obtained-this we have found to be the ex ception rather than the rule Usually in our experience the tear is a rather sharp transverse one which is easily approximated

It is hoped that in the near future a series of these cases will be presented from the Orthopedic Services of two institutions in one all cases with complete lacerations treated by immediate suture and in the other by fivation and apparatus only in such a manner can a sufficient number of cases be compiled. Final examination of both groups of patients if possible will be made by one who has had no part in the treatment so that his impression will be entirely unbiased.

CASE 3 No 109769 Displaced semilunar cartilage of the left knee excision of cartilage with complete return of function

An adult male 65 years of age an official of the Lakeside Hospital was admitted because of pain in the left knee. His previous history was unimportant Two months before while on a camping trip in Colorado he had stepped down from an elevation of about 12 mehes with the left foot the leg was rotated inward. He noticed a sudden sharp pain in the left knee he was unable to stand on the leg for several minutes because of pain. The knee became swollen and during the succeeding week he had seven or eight seizures of acute pain the major portion seemed to be on the internal aspect and several times the knee locked. He consulted an orthopedic surgeon in Denver who first strapped the leg but on recount of the persistence of pain and swelling a plaster cylinder was applied. Upon his arrival here 2 days later it was suggested that he wear the cylinder for at least 2 weeks. There was persistent pain in the joint for I week during which time he was off the leg. At the expiration of 2 weeks the plaster was removed there was a small amount of fluid in the joint. Crucial strapping was applied and worn for several days a considerable amount of fluid reaccumulated in the joint so that it seemed wise to apply a light plaster cylinder which was worn for a period of 3 weeks. Upon removal of this with erucial strapping the fluid reaccumulated and the pain persisted so that it was thought best to remove the cartilage

The physical examination showed a well developed and well nourished min whose appearance seemed hardly equivalent to his years. The heart lungs and abdomen were normal. The left knee was slightly swollen. The patella was just ballottable with an increase of one inch in the circumference of the left as compared with that of the right. There was definite tenderness to pressure over the neighborhood of the posterior internal joint space. A complete range of flexion was possible although it produced considerable pain upon the internal aspect of the knee joint. There was no increase in lateral mobility. The blood pressure was 120—75. The urine and blood were normal. A rocingrogram of the knees showed no evidence of pathology.

He had suffered a varying degree of pain continuously since the injury in spite of the various methods of fixation. In view of the negative roentgenographic findings, the history of locking and tendern as over the internal joint space a disjoincted internal semi lunar cartilag was thought most bl. ly

Following the usual 24 hour pre operative prepara tion the class cal incision as mad over the internal aspect of the knee E posure of the cartilage and that the posterior cornius was entirely free and rotated underneath the body of the cartilage at a small bulbous tip resting to a rid the periph rid (Fig. 2). The part is removed the joint other use appeared normal. The pattent made a normal conclusion of one cee. Motion of the part grainful increase! Since beginning to walk the part in the sexperienced no disconnor? There is a range of dege so flexion and the pattent is able to attend to bis usual duties without disconfior?

It is rather unusual to encounter such a severe and complete tear of a semilunar cartilage in one at the age of 65 since men of this age less often subject themselves to stress and strain which predispose to these injuries. It is of further interest that this patient was never entirely free of pain at any time following the injury. This is easily appreciated when one considers that the postenor cornua of the semilunar was completely folded under neath the body of the critiage where it remained until removal. This type of pathology is rather unusual since in an analysis of 117 cases by Pobert Jones there were

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Enlargement of the cornua into a bulbous its is a common behavior following complete tears. The feature of its complete rotation through a sagittal arc of 90 degrees to remun fixed in this position suggests a much more severe degree of trauma than the history in this case indicates particularly when one remembers that the posterior born is most firmly attached to the non-articular area between the tibul spine and the attachment of the posterior crucial ligament

CASE 4 No 5066 Loose body n left k e jo t remov l of body co picter covery of fur ciso

A married white school teacher 50 years of ace was a lmitted to the Harbin Hospital on D cember 3 1023 with the complaint of pain in the left knee Her present diff culty appeared 8 years before hen for a period of about 3 days she noticed an aching pun in the left knee It as not particularly troubl some until one year b fore when moderate's elle o of the part appeared The pain which vas a high in character and local zed beneath the patella k pt her awake to o nights The e was so ell no which persisted for about 3 days Follo ing this hen alking she frequently noticed a sharp pain in the knee an I upon several occasions the part had at the as beneath her. Four days before entry she fell striking the knee against a tree and at the same time she ga eth left I ga slight ty ist Swelling appear d and an aching pain k pt her a ake at night

The p st h store was un mportant e cept ir pneumona 35 years before. I ve verst perso also she had had a mild att ck of influen a. Te o years before the tonsil e ver r moved because of aching in the kin e during atmospheric changes.

The physical e amin tion showed a well developed female The to the er god the tons llar fossx vere clear th heart lungs an labdomen we e normal The left kne was one half inch greater in cirt m f enc than the right with a slight i cr as synovial flu d and m rked crep tation on mot o small m + ble body which appear d to be about th size of an acorn could be pulp ted i the oute capsule of the kne joint. There was mo lerate pen articular theckeni g hil the ra ge of joint moti was normal The un e and blood vere norm i Roentgenograms of the kn esho ed some sharpen g f the spi es of the tib al tuberosit s with a globul shado of increased dens to in the outer jo nt spa The left knee was explored for the loos body Pollout g an 8 hour p ep ration of the skin vith ale hol and buchl ride a d under ether angethes a a lin ar inc ion 2 in hes in length i as m d late al to the patell Thr ugh th subcutanco t sue the lo se body ould be palpated. It as it usfied tha Withe pn nd the neis n was car d do upon it The b dy was fr c in the joint and about i ce timete in di m ter E pl ation of the joi t f led to r veal othe lo e bod es present d as losed in the u ual ma ner

The pat peralt cours was use tential alth patt at a sisteharged to dash fl in sprio.

I foll wup lett in Septemb of 6 tat d in set that 6 m s tenta do tor for it since y u damasted me from y urce.

CASE S N coppo Out of list of set y the transfer of the form is me that of the form is the first set of the form is the form in the form in the form is the form in the form in the form is the form in the form is the form in the

type trop led mi p tell ri t p i lift so b due et s n f i f pat ll fil p d complet c y ff i ton A marr d Itshan stret peddlet 47 vear i ge h

A marr distinguish to people in the complete to find the complete for pair in the ght k. H. h. ability bega 23 is b fe i h. pon steppi 8 down from the curb he felt a sudd in shaip pain

upon the inner lateral aspect of the right knee joint. This pun remained loc dized was one what ship in character and was exaggerated by moth m and weight bearing. The knee immediately became swollen and was o painful that his utivity very hanted. The pun slot hy subsided until a week before entry when it recurred and forced him to hed Climbing starts produced the maximum imount of pun There was no history of locking.

His past history was rather unimifortint. There was no history of trauma-evep that I verife. I us ly he had bumped the right knee against the brike handle of a Ford truck, which produced some for only 2 days. He was the frither of a family of seven children all hving and well. There was no he fore of previous infection. He dained verier for very

The physical examination was unimportant except for the right knee which was 4 centimeters greater in circumference than the left. The pitella wis ballottable. Slight increase in urfac heat was present but no redness. Moderate tenderness to pressure existed over the region of the internal joint space with crepitation upon motion. I letion cause l considerable pain beneath the patella and was limited about 60 degrees. There was complete ex tension with no increased lateral mobility (ar ful searching failed to reverl any foci of infection Roentgenograms showed two small calcined I clies in the lateral urface of the joint space with in area of irregularity and decreased density is continuous in diameter over the inner condyle of the femur and also a rather smooth shadow of increased density extending from the lateral cortex of the upper tibis below the epiphyseal line. The latter suggested an osteom: Aspiration of 10 cubic centimeters of fluid from the knee showed a cloudy straw colored rather viscid fluid. A smear showed about eight large mononuclear c lls per high power field Cultures and guinea hig inoculation were negative. An arthro pneumogram was made at this time which showed the hypertrophied infrapatellar fat pad and the loo e bodies quite clearly (Figs 3 and 4) The tempera ture white blood count and urine were normal. A diagnosis of osteochondritis dissecuts and hyper trophied infrapatellar fat pad was made

The knee joint was exposed through a patella splitting incision which revealed a rather hyperamic synovial membrane with villus tabs throughout the joint (Fig 5) A loose body was found free in the infripatellar portion of the joint about the ize of a small butter bean. There was a multiplieity of tabs hanging free in the joint. The ala hgaments and the ligamentum mucosum were m irkedly hypertrophied There was an irregular area of crosion extending about 7 millimeters in depth and 1 centimeter in diameter upon the inferior mesial condyle of the femur The larger fibrous tabs were excised together with the infrapitellar fat pad. A complete syno tectoms was not done. The joint was closed in the usual manner. The patient made a normal po t operative convalescence. The wound bealed per primam Histological examination of the loose body

should hy aline cartilage and a considerable of white fibrous connective tissue with a fairl sive infiltration of soft tissue by small hympi

The patient was in the hospital for a per weeks. Physiotherapy was begin 10 day operation. The patient returned to his word end of a month following operation and a feletter from him 2 years after operation stath could not return to the dispensive because work, that he had had no pain or disability have successful.

knee since operation

Café No 115277 Loose bodies in rig
joint with seven deformity of the joint hypei
osteo arthritis exploration of the knee joint
if loose bodies correction of the seven deform
explete recovery of function

A married white female 50 years of a referred to the hospital September 1 1926 of severe pain and locking of the right knee : perfectly well until 2 years before when a sharp pain appeared upon the internal aspec right knee joint. It was distinctly worse upo ing and occasionally kept her awake at mit h knee became swollen shortly after the initia and b cause of this pain she consulted a bon nuthout relief Later a physician was consult treated her with diathermy for several weeks improvement. A chiropractor was then semanipulated and massaged the part. She mai that there was complete relief for a period months afterward I ollowing this however again became painful and up to the time of ad there had been intermittent swelling of th Prolonged periods of rest gave relief. Dur preceding 3 months the knet had occus locked and the part had become progressively

Her past history was unimportant except to the left arm 2 years before which was contobe neurits. There had been a moderate of constinction. I configuration of the tentile time showed two suggestive areas of absenting the state of the configuration.

The physical examination showed a fer average beight somes hat overweight. The many crowrs upon the teeth with moderate The tonsils were atrophic and sor The heart lungs and abdomenormal The upper extremities and left leg ar to be normal while there was about 5 centim-atrophy of the right thigh and calf. The kr flexed at an angle of 35 degrees from a straigl extension beyond this point was impossible was moderate crepitation and the patella w placed somewhat toward the outer condyle femur. The part showed a moderate genu v with thickening of the periarticular stru especially in the neighborhood of the infrap region and some tenderness in the neighbork the suprapatellar pouch Deep pressure cher irregular resistance which suggested loose She was able to walk with the knee flexed

Reentgenograms of the knee showed hypert changes of the joint (Figs 6 and 7) Ther several calcifi d masses in the upper outer supra patellar pouch The urine and blood ere n rmal The renal function was 55 per cent in 2 hours. The blood pressure as 150-00

In view of the cons derable disability ht h the patient uffer d it seemed wise to remo e the loose bolies hich w re present and stret h th knee into

extension

The sk nover the region of the kne vas p par d 4 hours before operation I he to nt was sposed by the nat Ila splitting incision. The synovial m m br n showed considerable ordema and hip armia The supraprt llar pouch in its mesial porti n as of lit rated three fr e bodies a habout th si e of a small be an a e found in the oute unrapat flar pou h Three other bods s about the size of small p as er found hangin by n r v pedicles There as almost an ntire absence of cartil g b n th th patella and o er the condules of the 1 mu The semilunar cartilag s were intact although the m s al as some hat flatten da ds I rotic Multiple small bodies about the size of a pin heal hi g g fr m small shr ds were pr s nt thr ughout th syno ial ca ity. A mode ate sized no tion of hyp r tr phied infrapatellar fat pad sexted The I g vas stretch dout to complete ext sio a dth cart placed in a plaster evander. The p ti nt m he n une entiul postoperat e con al sc ne I h sa therap as begu at the end of to days ther hual incr as n eight bearing. She rapidly r gamed us of the part and as able to valk athout support 3 v eks aft r operation The pat ent v s se n o e arfollo ng operation nd she st ted th t sh had had no d scomfo t or pa n in the k ce s n e lea ing the hosp tal the ra ge f motion as empl te

CASE 7 No 1 7680 Oste artirts (ill us top) fkices sy or clot y of left knew th el f foan ard sulls g

1 hitemale 3 years of age entered th L kes 1 Ho pital Feb us v 7 1927 with the complaint of pain and s clling of both knees. He had ben per ictly well until F bruary 1 19 2 he he noticed pan in the left knee. It is guite siver but h c ntinued with his with that day. D ring th vening the pain became more se ere he had a chill and wa fe ish F se cald is pe oush he had a cold hich ge dually smir ved I o lays it onset f pun in the lift kne the sam cond tion develop di the ght k & H eo sulted n loctor 5 d ys aft r the onset Fluil Ira vn from the l ft knee and he state l th t it v s cl ar a d mber in color The fluid I curr d and the pain cers stel L cal heat as appled thout re hef On M ch i he entered the hospital here h ren med for 3 mo ths H was given a vacer wh h p oduced c sid r bl re ction I llowing h ch ther was defi ite imp oveme t in both knee II was d charged from the hospit lat the m the Th knee were at il swollen and somer hat st ff

Thre months I ter roentgenogr ns vere t ken which he claimed shoved no evidence of disease

He r turned to work in a bakery about the time an I vas able to carry on with his vork until th coll veather when pain and sv llng recurd Various types of physiotherapy were tried vithout much r lef during the succeed g year and b cause of the s were pain he was given morphine by the doctor and this subsequently result d in mornh n ad hetion he took from 8 to 1 grains a day unt la t v months before admis ion when he discontinued the h bit soluntarily. The pain and svelling in the knees had persisted vith little change to the time of a limis ion. He entered the hosp tal with the com-

His past histo y revealed that at the age of 7 years he a ht in the right eye with r ulting loss of 1 Islan The sec nd toe of each foot had been am putated for hammer toe a number of years befor During the past o years he had had a chronic p o ductive co gh which had been orse in winter In or h had a gonorrhoral urethritis which clea d up 1 ith n 3 ecks and parotitis in 10 0 1 ithout any complication. There had be nea loss of 10 to 15

pounds during the preceding month The physical tamination should a well developed some hat pooly nou ish d male. The le s of the rght eye vas ve v opaque with complete blindness the left pupil was quite regular and reacted to light an I listance The heart lungs and abdomen normal B th knees showed a marked fus to m selling and the patelle fl ated. The knees fimited to within o deg e s of complete e tenso s ith a range of about 80 degrees of fle ion Talpati r verled no ar as f tender ess but regular bod h h noved fr ly beneath the palpating fi g could be felt in the lateral suprapat llar pour h

Th roentgenograms of the t eth and the tshow d no e lence of pathology while films of th 1 ccs sho d s me oblt at n t the joint sp part al calcificatio of the 1ght external em lunar artilage and sharp tib alspines. The blood pressur

v s 110 -65 The flud from the knee as st aw colo I and I many ound cell The cult r 1 as negat e Guines pig mo ulation fail i to shoy brulos Pr tate smars sho da few lu t s but o 1 t acellular d plotot Th sput m sho d no tul crel b cilli The blo d Was rman a d Wase mann up n flud from th k g the The ur n n s norm lupon t oe mina tions The I ucocyt s numbere 17 00 er throcyt s 4 3500 o and ham gob &o pe ent A lumbar punctu e showed n mal 1 trispi l pressu lear flued 4 cll no globulin and the sp al flued Hass rmann was neg tive It as thought that he disablts r sult I from a villus arthriti a lin wof the pers t nee of the d tub neth dial pro edure of syro ectomy of the lift kee comed and ate l

hp t lla spl tt ng Under sp langesth a a 7 inc on as m d er the l ft knee (Fg 8) E posur of the joint healed all rgc amount fich ar amber flud There was marked Il hypertrophy

of the synovial membrane scattered throughout the entire joint. The cartilaginous covering of the condule patelly and tibia appeared relatively normal The hypertrophic tabs were excised and all of the accessible hyperemic synovial membrane wi curetted The infrapatellar fat pad was excited The tourniquet was removed and the wound wi sutured in the usual manner A plaster splint wa applied from the groin to the toes with the knee in 15 degrees of flexion

The patient made a satisfactory convalence ne except for a rather high rise of temperature which reached 30 5 degrees C on the third day aft roperi tion Within 7 days however it had descen kel to normal. The wound healed per primam. I hysiotherapy was begun at 10 days after operation. In weeks the patient was allowed up with crutches and was allowed gradual weight bearing until 4 weeks after operation when the crutches were disearded He was discharged from the hospital on April 1 after a period of 34 days in the ho pital

The histological examination of the tissue showe I multiple foci of lymphoid cells surrounded by a deposit of loose connective tissue Certain sections showed papillomatous processes cut in cross section and nehly infiltrated with leucocytes and round cells. The pathological diagnosis was subscute and chronic inflammation non tuberculous in charicter

Unfortunately it was impossible for this patient to have physiotherapy after leaving the hospital His ability to walk gradually increased there was no reaccumulation of fluid in the joint and no pain In view of the marked improvement in the left knee the patient returned to the hospital July 1927 with a request for the same operation upon the right knee It this time the left knee showed only periarticular thickening without fluid (Figs 9 and 10) it was painless and there was a range of 75 degrees of flexion

It is not the purpose of this paper to classify or to discuss the various types of arthritis It so happens that several of the above cases in which loose bodies were present occurred in patients with an obvious proliferative type of arthritis and so far as terminology shall be spoken of under the rather general name of osteo arthritis in our experience by far the greater proportion of the patients with loose bodies in the knee have osteo arthritis We are here interested primarily in the surgical aspect of this disturbance realizing that in these cases with advanced bone change it is tarely if ever possible to eradicate the disease ompletely In properly selected cases how

ver it is possible to give complete relief hile in others function can be tremendously improved

In all of our cases there has been a definite degree of improvement. A search for the ctiology of the osteo arthritic changes was carried out most thoroughly in all cases but since this is primarily a consideration of the surgical aspect etiology was not discussed One of our most gratifying results occurred in a patient who had been incapacitated for 4 months unable to get around except by the aid of crutches without any use of the right lee because of severe pain beneath the patella upon usage. The rountgenograms fuled to show anything other than some atrophy and sharpening of the tibial spines and tuberosities All previous measures such as physiotherapy and apparatus had failed to give relief with certain misgivings the joint was explored through a patella splitting incision and noth ing other than a hypertrophied infrapatellar fat fringe was found to account for the pain this was excised. It has now been 6 years since operation and the patient reported a short time ago that there had been no discomfort or disability in the knee since operation

Very little emphasis has been placed upon the frequency with which loose bodies occur in the knees of patients with osteo arthritis further there has been a lack of enthusiasm for their removal Recently several cases have been encountered where loose bodies have been responsible for a complete disability and their removal has resulted in a complete return of painless function The period of postoperative recovery has been short the wounds have all healed per primam and the stay in the hospital

has rarely exceeded three weeks

The incidence of occurrence of true osteo chondratis dissecans has been very low so that our attention here is largely directed toward the osteo arthritic type. Case 4 showed such slight changes in the joint that it might have been classified as a true osteo chondritis dissecans although the sharpening of the spinous processes was thought to repre sent a mild osteo arthritis. Schile changes in joints as presented by the roentgenograms are frequently difficult to differentiate from a mild osteo arthritis and the presence of symptoms of osteo arthritis is often the deciding factor It was impossible in this case to say whether traum's played a part in production of the

body the singularity of the body the lack of visible gross changes in the joint and the fact that within 4 years the patient has had no further trouble would strongly suggest that it might have been traumate in origin. This loose body was free in the joint quite smooth and ovoid in outline there was microscopic evidence of cartilage and fibrous tissue. Bod ies of this type tend to occur in pouches or recesse of the synovial membrane where they remain without chinge of position, they may reach a large size. Because of their tendency to remain in one position they rarely cause symptoms and are often discovered accidentably.

The loose body which occurred in Case 5 probably arose from the cartilage and should be termed a synoyial chondroma

The extraordinary degree of hypertrophic changes in Case 6 are quite striking as well as the early return of satisfactory function. The history is quite interesting the disability extended over a period of 2 years during which time she had practically every form of therapy with brief periods of relief until the deformity plus the discomfort finally forced inactivity. An illustration of the attitude of the medical profession toward surgical inter ference was brought forcibly to our attention in this case Shortly before coming into the he had consulted a nationally prominent internist who had advised that if the loose bodies were removed the knee joint would certainly be stiff. There is little neces sity for detailed discussion of the nathology in this case since it is a rather ordinary type of hypertrophic osteo arthritis except for the unusual number and size of loose bodie present Unfortunately the artist was not asked to make drawings of the bodies but an idea of their relative size can be gained from the roentgenographic appearance. Since no dennite etiology could be demonstrated at the time for the osteo arthritic change and in view of the numerous synovial tabs it was felt that an early recurrence might take place It has now been one year since operation and no signs have appeared

Case 7 is an example of a prolonged dis ability which had resisted every possible form of conservative therapy The patient had

become worthless to himself as well as to society and to make matters worse during the course of his discomfort had become a mor phine addict following the administration of a few doses by a doctor for the relief of the pain Both knees presented massive swelling the r sult of villous hypertrophy with a large amount of fluid while the articulatin portions of the joints were relatively normal. It is interesting to note that such a process can persist in statu quo for such a lon, period There was little choice of therapy since every thing except actual removal of the offending synovial membrane had been tried without satisfactory improvement. Further it was not possible to unearth any factor out ide the joints which might have been responsible for the disturbance other than the history of an old chronic bronchitis. The blood Was er mann dal not seem sufficient and thus the fluid from the knee was tested with a ne ative result This case then appeared to be an excellent one for synovectomy at least as a trial procedure upon one knee Since key s (3) experimental work upon sy novial regenera tion we have approached these problems with less he stancy although as yet we are unable to understand thy the regenerated stroytal cells should differ from their predecessors in their behavior. A pre existing focus of infection or disturbed inetabolism mucht produce the abnormal behavior of the cells later to be corrected at any rate before the resenerated cells begin their function. This explanation will not ht all cases and to postulate that there is less tendency for proliferation and hyper activity of cells following injury is contrary to the physiologic activity manifested in other tissues for when there is demand for repair during the early stages particularly quantity of cells is usually in excess of the normal requirement. The result in this ca e was highly satisfactory the excess fluid and the pain were completely relieved while there was a range of 70 degrees of painle > motion The operation afforded such relief that the patient voluntarily requested the same treatment for the other knee this as carned out only a short time ago and promises a better result than the former operation because of a greater range of motion

SUMMARY

The primary purpose of this paper is to emphasize the importance of early surgical correction of complete lacerations of the internal lateral ligament and capsular tears of the knee joint in preference to fixation and apparatus alone There has been a considera ble increase in the incidence of these injuries due to the greater number of automobile accidents Late repair is rarely so satisfactory as the immediate approximation of the torn structures and further it is the impression that these patients so treated suffer a shorter period of disability Two representative cases from a group of 16 are reported in detail. An unusual laceration of the posterior cornua of an internal semi lunar cartilage is discussed the persistent pain even with the part fixed was explained by the position of the torn cornua Removal of the cartilage gave complete relief

Several different types of loose bodies in the knee joint are considered their removal resulted in complete return of function. Synovectomy of the knee joint is considered a patient with villous arthritis and hydrops was subjected to this type of operation and satis factory results were obtained.

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635-697

THE EFFECT OF IODINE AND THYROID FEEDING ON THE THYROID GLAND

AN EXPERIMENTAL STUOM

BY W B MOSSIR M D PHIL DELP IN William H. B. t. H. w. I. S. e.

OR several years we have accepted Plummer s theory as an explanation of the effect of rodine on the course of hyperthyroidism He believes that the toxic gorter secretes an abnormal substance which has been designated desodized thyrovin and that iodine everts its beneficial effect by supplying the iodine radical to this substance

I ecent investigations however have cast considerable doubt on Plummer's theory as the following facts attest

- I The theoretical abnormal substance has not been isolated its chemical formula is unknown
- 2 The theory fails to explain the relapse following an initial temporary improvement when todine is given to patients with hyper thyroidism
- 3 Several observers bave demonstrated that the picture of hyperthyroidism can be constantly produced in the experimental animal by intravenous administration of normal thyroxin (3 5)

4 Administration of iodine has no effect on the course of experimental hyperthyroid ism ie there is no effect on the circulat ing thyrotoxic substance (, 5)

5 The studies of Keinhoff and Cattell who took specimens from patients before and after rodine medication have shown that an involutional change occurs in the gland itself (1 4)

In view of this evidence it becomes in ereasingly more difficult to accept Hummer s It is certainly much more logical to assume that jodine everts its effect at the seat of production of the thyrotoxic substance than on the circulating town. It was there fore to determine something concerning the effect of sodine on the thyroid gland under various conditions that the following studies were made

Adult dogs that had been fed the usual animal house mixed diet for several days were used During the observation period they were kept on this diet, which was vaned only by including rodine or thyroid extract Small specimens were removed from the thyroid gland at the beginning of the ob servation period at intervals after giving medication and several months after the drugs were discontinued

Group r After a section had been removed for microscopic examination the dogs were given todine in the form of Lugol s solution 10 minims daily for 6 weeks at the end of which time a second biopsy was done. After an interval of several months during which m medication was given another biopsy was done

After preliminary biopsy the Group animals were given thyroid extract in in creasing quantities until they exhibited symp toms of hyperthyroidism A second section Iodine was then given lor 6 was taken weeks at the end of which time a third ection was taken After a rest period of 3 months a fourth section was taken

Group 3 In this group the rotation of drugs was similar to that in Group except that the thy roid extract was continued during the b week period that the animals received iodine

RESULTS

The histological picture of the specimens removed from different animals after similar rotation of medication showed considerable variation the most frequent variation bein an absence of the typical todine effect. As a rule however the histological picture was similar to that seen in the photomicro-raph here presented

Group 1 Figures 1 and are photomicro graphs of the low and high magnification of the thy road gland of a normal dog Figure 3

w fP 5l ShifMd c Imh Dptm ISgy dRes hSgy U

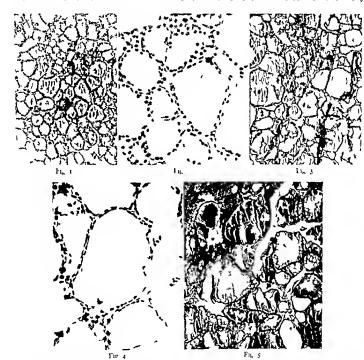


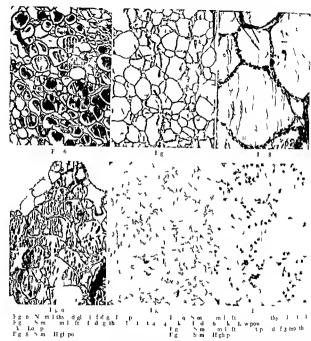
Fig. 3 Normal the road gland of do. Low power
Fig. 3 Section from same animal after being f. d.
100tine for 6 weeks. Low power

and 4 ire from the same dog after receiving iodine for 6 week. As comprized to the normal gland it will be noted that the acmi are distended with colloid and when seen under higher mignification the cells liming the acmi are distinctly flattened. It is reason able to assume that the ingestion of iodininas produced an increase in the amount of colloid which in turn has produced by com

Fig. 4. High power shotomicrograph of same ection as shown in 11 are 3. Same animal after a rest period of 5 months Lo power

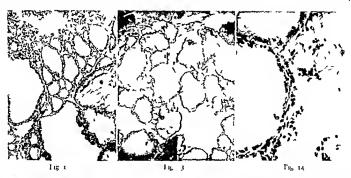
pression a very evident distortion of the cells. This condition may persist for a con siderable length of time as shown in Figure 5 which is a section from the same animal taken after a rest period of 5 months.

Group 2 A normal section is shown in Ligure 6 After receiving thyroid extract for a month the sections shown in Figures 7 and 8 (low and high power) were taken. It



will be noted that the effect of thyroid extract is practically identical with that of iodine (Figs 3 and 4) ie the acum red is tended with colloid and the liming cells are compressed. The thyroid extract was then discontinued and iodine was given for 6 weeks at the end of which time a section was taken (Fig. 9). This section hows practically no change from that taken after thyroid

medication. In a few of the sections the amount of colloid was slightly increased. All medication was then stopped for 5 month. It the end of this period ections were again taken (Figs. 10 and 11). The morpholo 1 cal change in these sections is very traking when compared to the normal gland of the same animal (Fig. 6) there is no similarity of structure. The amount of colloid is greatly



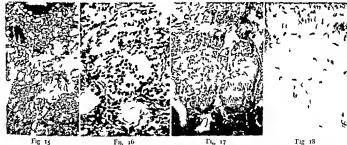


Fig. 15 Fig. 16
Fig. 12 Effect of iodine ingestion on a normal human

thyroid

Fig. 13 Typical effect of 10d ne on hyp rpla tic toxic go fer. Low power

Fig 14 Sam High power
Fig 1 Section sho ving the effect wh h the prolonged

diminished The cells are detached and he free in the acini. Under higher magnitication the cells are granular and the evolptism is vacuolated. This stage which occurred very frequently after prolonged administration of thy roid extract and iodine was interpreted as a period of exhaustion.

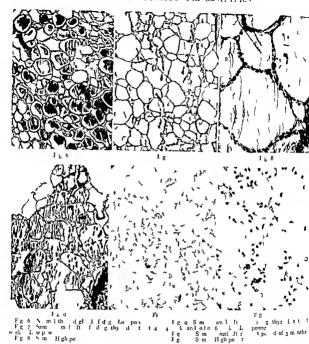
Group 3 In this group the same morphological changes occurred as in the previous group. The stage of exhaustion was identical with that produced in the dogs in Group 2

administration of iodine has upon hyperplastic toxic goiter Low po ver

11 16 Same High power

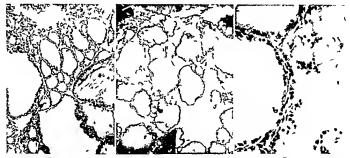
I' = 1 Effect of prolonged sodine admini tration on hyperplastic toxic goster Low power ki = 18 Same High power

Interpretation of results. We are justified in concluding from the examination of the various specimens that iodine stimulates the gland to produce colloid. This process continues during the stage of experimental hyperthyroidism. As the colloid increases the cells are compressed and flattened. This mechanical compression may very possibly prohibit at least temporarily the usual secretory function of the cells. After prolonged administration of iodine and thyroid



will be noted that the effect of thyroid extract is practically identical with that of rodine (Figs 3 and 4) i.e. the acim are distended with colloid and the lining cells are compressed. The thyroid extrict was then discontinued and rodine was given for 6 weeks at the end of which time a section was taken (Fig. 9). This section shows prutically no change from that tale en after thyroid

medication In a few of the sections the amount of colloid was slightly increased All medication was then stopped for 3 month At the end of this period sections were again taken (Figs 10 and 11). The morphole is cal change in these sections is very trikin When compared to the normal gland of the same animal (Fig 6) there is no simila ity of structure. The amount of colloid is greatly



lig 13



Effect of iodine ingestion on a normal human

thyroid Fig 13 Typical effect of iodine on hyperplasti toxic gotter Lov power

4 Same H h power Section sho ving the eff ct vh h the prolonged

dımınıshed The cells are detached and he free in the acini Under higher magnification the cells are granular and the cytoplasm is vacuolated This stage which occurred very frequently after prolonged administration of thyroid extract and iodine was interpreted as a period of exhaustion

Group 3 In this group the same morpho logical changes occurred as in the previous group The stage of exhaustion was identical with that produced in the dogs in Group 2

adm ni tration of iodine has upon hyperplastic toxic goiter I ou pouer Γ " 16 Same High power

Fig. 17 Effect of prolonged sodine admini tration on hyperplastic touc goiter Low power Fi 18 Same Hoh power

Interpretation of results We are justified in concluding from the examination of the various specimens that iodine stimulates the gland to produce colloid This process continues during the stage of experimental hyperthyroidism As the colloid increases the cells are compressed and flattened This mechanical compression may very possibly prohibit at least temporarily the usual secretory function of the cells After pro longed administration of iodine and thyroid

extract the cells become extrasted show change of degeneration and are no longer capable of producing collor!

FFFECT OF JOHN ON THE INTERPLANCE TONIC GOLFFI

The morphological changes produced by the administration of todine to patients with primary, hyperthyroidism have been well de cribed. The acini are usually distended with colloid. The cells are transformed from columnar to low cuboidal and often are exfoliated and degenerated.

It is interesting to note the effect of icdine on a normal human thyroid as shown in Figure 12. The actin are distended and the cells have changed from a columnar to a cuboid type. The effect is quite imiliar to that produced in the experimental animal after jodine feeding (1) is a rind.)

The typical effect in toxic patients who have been operated upon during the tige of maximum improvement is hown in lighted at and 14

The most intere ting group of patients from the standpoint of the present study are those who have taken joding for a prolonged period of time and who has e come to on eration after they have escaped from its benefit Microscopic vamination of the e specimens shows a maximum effect of iodine The cells are often degenerated exfoliated and vacuolated Clinically however the patients at the time of operation are often extremely toxic and represent a considerable surgical risk Figures 15 and 16 (low and high power) are from a patient who took iodine continuously for 18 months Durin her pre operative hospitalization the basal rate dropped 11 points At the time of operation she was considered a serious risk although the section shows a maximum effect of rodine Figures 17 and 18 are from a similar case. The patient took iodine at in

If the sections from these pitient who took iodine for several months are examined carefully (fig. 15 16 17 18) a striking resemblance to the se tion taken from a dogerolonged iodine and thy rold medication is seen (fig. to and it). It would seem that

terval for several months prior to operation

prolonged induce administration in these pittents has produced a stage of exhaustion in the gland similar to that produced in the experimental animal.

Consideration of the facts here presented is I believe sufficient basis for a theory to explun the action of iodine on the toxic gotter When jodine is first given the cell are stimulated to secrete an excessive amount of colloid This colloid tills the acini and mechan ically compresses the lining cells thus re ducing their secretory power. Less thyroxin 1 produced and the patient shows clinical improvement Gradually the cells adjust themselves to the changed condition and resume their secretory power. The amount of the roun is thus again increased and the toxic symptoms increase proportionately Further jodine medication fail to alter the production of thyroxin but does continue to stimulate colloid production. After prolon ad iodina administration the cells be ome exhausted can no longer produce colloid and on continual to line stimulation they degenerate. However even in the stage of exhaustion they are still quite capable of carrying out their pathological function ie production of excesive amounts of The microscopic picture which is thyroxin usually interpreted as a specific effect of jodine on the thy rotoxic producing properties of the cells is in reality the effect of prolonged and exces is e colloid production

It is an intere ting coincidence that De Courcy () from climical observations has arrived at the same conclusion regarding the eff ct of jodine as is here tree ented

CONCLUSIONS

In the experimental animal iodine stimu lat s the cells to produce colloid

2 Colloid retention compre es and flattens the cells of the acim

3 The ame effect occurs from rodine ad ministration in the pre ence of experimental hyperthyroidism

I rolonged todane administration to a hyperthyroid anima produces a stage of chaustion in the land

3 The effect of iodine on the normal pland

is similar to that in the animal

6 The effect of jodine on the hyperplastic toxic goiter is similar to that obtained in the

normal aland of the do-

7 After prolonged administration of jodine (3 to 1 months) to the patient with hyper plastic toxic goiter a stage of exhaustion is This is similar to that produced in the animal by prolonged feeding with thyroid extract and judine

8 The clinical status of the patient is not proportionate to the histological picture when todine has been taken for a prolonged period

a A theory to explain the action of jodine in the Datient suffering with hyperthyroidism is presented

RITITINCIS

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MORPHOLOCICAL CHANGES IN FXOPHIHALMIC COTTER FOLLOWING THE USE OF LUGOL'S SOLUTION

BY C. MENANDER HILLING M.D. WICHTA KANSAS Fmth Lbc t v fth Hlt dif t t l ll t t k

TT is now generally recognized that in every case of Graves disease the thyroid gland A shows constant pathological changes Many authors agree that the microscopic picture runs parallel with the clinical course When Plummer proved that the administra tion of Lugol's solution was followed by a striking remission in the toxic symptoms a search was at once begun for an anatomical basis for this fact

Rienhoff Cattell and Giordano in this country and Merke in Switzerland con cluded that after iodine medication the ex ophthalmic goiter shows such a high grade of involution that it resembles the normal gland or colloid goiter In seven cases of severe ex ophthalmic goiter Rienhoff removed a por tion of the gland before any medical treatment was given and compared it with the gland which was later resected after the administra tion of iodine Merke likewise made a com parison of tissue removed from the same gland before and after Plummer's treatment but his first excision was combined with ligation of two or more thyroid arteries

Rienhoff's method is ideal if he succeeded in making the first excision without ligating any of the thyroid arteries It is difficult to under stand how he could remove a large portion of the gland including the whole upper pole with out interfering with the blood supply We

know that ligation of the thyroid vessels causes changes similar to those described by Rienhoff This being the case it is necessary to use great care in drawing conclusions from such methods Another source of error that must be taken into account is that the same exophthalmic goiter may show entirely different microscopic pictures in various portions of the gland

In our study we examined slides from 30 patients who had not received Lugol's solution prior to operation and from an equal number of patients who had been given Lugol's solu

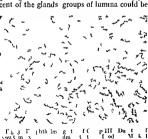
tion before operation

The first series was studied to establish a basis for comparison. All of the cases presented the complete clinical picture of Graves disease but the duration and severity of the clinical symptoms varied. In the second series in which Plummer's method of treatment was used various grades of toxicity were present so we did not follow Giordano who selected for comparison only the thyroid glands of pa tients dving during thyrocrisis

Most authors make a sharp distinction be tween primary and secondary evophthalmic goiter The expediency of this division is questionable From my own studies not alone of these 60 glands but also of many clands from patients of European extriction I am forced to the belief that exophthalmic goiter



develops usually in a diffuse colloid goiter In 3, per cent of the glands in my liest serie the pritients had not received todine and the glands did not present the classical diffuse meaty dry appearance on the cut surface but were amber red and translucent either throughout or in patches here and there sug gesting a colloid rich tissue. In nearly 8, per cent of the glands groups of lumina could be



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distinguished with the untilded eye. These lumina repre ented large colloid containin follicles such as one never sees in the normal clind but which are characteristic in the diffuse colloid couter. I ven in glands with uniform dry meaty cut urface these lumina were eldom missin,

Likewise the distinction usually made clinically between innocent colloid and evophthal mic gotter does not eem to be justified since the diffuse colloid gotter at least the proliferating form is often as ociated with slift symptoms of hyperthyroidism. In his treatie





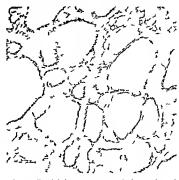
Fi 5 Section from exophthalmic goiter r mov 1 fr m gul 15 years old who had not received the 1 lummer tr t ment. We find the tran itional stages from colloid to exophthalmic goiter large round follicle branch d narro ducts and solid areas. The acmi appear empty

on diseases of the thyroid gland Hertzler mentions that he often saw slight toxic symptoms in young people who were developing colloid goiter and in his recent article on classification of goiters he hrings out clearly the relationship between colloid and evoph thalmic goiter

From their microscopic appearance the glands of our first series can be grouped in four different stages of hyperplasia

Group I Diffuse colloid goiter with marked epithelial proliferation (Fig 1) The 9 cases which belonged to this first group had toxic symptoms only a short time or only in a moderate degree of severity Microscopically the acini of these glands were much larger than were those in the normal gland and were extremely irregular in form hecause the epithe hal wall extended into the lumen These ele vations of the wall were covered by a high epi thelium with slender crowded nuclei which stained deeply while the remaining circum ference of the follicle still exhibited a euboidal epithelium The colloid was markedly dimin ished in amount and altered in quality. The normal eosinophile refractive material was re placed hy a very pale staining vacuolated sub stance In two cases the content of the acini had not taken any stain and the lumina ap peared empty

Group II The second stage of development of the lesion The acini in the four glands in



Is, 6 Exophthalm gotter r mo el after 13 days of the I lummer treatment. The gotter belong to Group I. The large acmu are filled with well stained colloid.

this group were narrower and still more polymorphous than were those in the first stage because the clevations and foldings of the wall were higher and abundant. The epithelium of the whole circumference of the acruis was columnar. Beneath the epithelial lining of

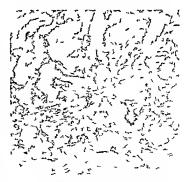
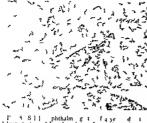


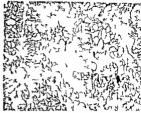
Fig 7 E ophthalmic goiter removed after 12 days of Plummer treatment Colloid filled with acmi marked epith hal proliferation of the vall Belongs to Group III



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the projections a closely packed mass of the thelial cells was seen with many capillaries These solid cell groups could be traced to the epithelial lining by diverticula budding from the wall (Fig.) In the e which were at first solid masses small acini form by separation of cell groups which in my judgment is the most common way of producing the formation of It is the same process which new follock Sanderson described in the normal adolescent gland and which is found often in the diffuse colloid goiter By this new production of cells secondary lobules are formed the per ipheral cell masses of which are descendants of the epithelial wall of a large acinus luming become more and more narrowed until a branching elongated duct results irregular duct like forms of the acini in the exophthalmic goiter caused klose Zander and others to hypothecate their origin from the central canaliculi of the embryonal thyroid gland I believe on the contrary that these ducts are not the origin but the final product of the epithelial proliferation

Group III Exophthalmic goiter (Fig. 3) The e were 8 glands in which the epithelium predominated and which on the first glance appeared as solid mas es of cells With higher magnification very small acini could be seen surrounding ramifying long narrow ducts These were regarded as rests of the former wide lumina of the colloid goiter. The acim appeared empty or their content faintly aci dophilic looked ragged and granular



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Solid type of exophthalmic Group IV gotter (lig 4) The solid type of exophthalmic gotter was seen in even of our cases Clinic ally they did not as in Pienhoff's opinion represent acute very severe cases of Grave disease but the toxic symptoms were of lon standing All made a good recovery after operation In the only acute case in our series in which the outcome wa fatal the patient died without operation and belonged to the second group

Generally Group IV is distinguished as solid or glandular-in contradistinction to the papil lary type We consider these old gland the final stage in the development of exophthalmic goster and not an entirely different type of goiter because we find here and there in ec tions of solid exophthalmic goiter the same long duct like ucini we find in the other

In one third of the glands it was difficult to determine the exact stage of development be cause their microscopic picture was so varied Different portions taken from the same gland and even different areas in the same micro scopic section may show different sta es of epithelial hyperplasia In I i ure 5 all kind of transitional stages are present the wide round follicle of the quiescent colloid soiter the irregular acini of the papillary form and the solid tissue of the glandular exophthalmic gotter The focal nature of the alterations in

the thy roid may be recognized in the fresh cut surface of the gland by the opacity and granu lar surface of the altered areas in contrast with surrounding colloid rich tissue (21 per cent of our first series). It is difficult to understand which lesion should appear thus in certain areas only involving agreat number of alcohor only a few follicles. It is necessary, however to keep these facts in mind in studying the pathological changes found after Plummer's treatment.

We made a study of the glands in 30 pa tients who had evophthalmic goiters and who had received Lugol's solution from 3 to 19 days before operation The gross appearance of these glands requires a brief consideration Rienhoff was struck by the vast difference between the thyroid glands in patients treated with iodine and in those in which iodine had not been given. In the former the gland seemed to him to be quite definitely increased in size and harder in consistency the capsule was thickened and seemed to bulge with the contained lobulated parenchy ma On incision he found the gland in certain areas more re sistant to the knife, the lobulation being more pronounced The cut surface was glairy and showed small cyst like areas suggesting be ginning adenomata which were full of fluid resembling colloid The glands of our second series did not show any striking difference in their gross appearance as compared with the glands in which iodine was not given Seven teen per cent of them had a glairy translucent amber red cut surface but this was noticed also in 16 per cent of the first series In about the same percentage as for the glands taken from unprepared patients namely in 83 per cent the lugolized glands presented typical gray meaty parenchyma either uniform throughout the cut surface or only in numer ous irregular patches Cyst like lumina were found in 74 8 per cent of the glands of patients receiving iodine and in 848 per cent of the glands of patients who did not receive iodine

MICROSCOPIC FINDINGS

Rienhoff describes the acini as wide bal looned of regular form and size. We expected to find after Plummer's treatment only glands belonging to our Group I. But we had to classify our microscopic findings in the same four

groups with about the same percentage as in our first series. Twelve cases of our second series belonged to Group I (Fig. 6), 3 to Group II 7 cases represented the third (Fig. 7) and by the fourth type of our classification (Fig. 8). Considering the size of the follicles and the amount of solid parenchyma, we were not able to notice any striking difference between the two series. We believe that the size of the action depends on the stage of development of the lesson, and we must not compare pictures of different developmental stages as apparent by Rienhoff did (Fig. 9).

Rienhoff noticed in the glands removed after iodine treatment the enormous increase in the fibrous connective tissue disseminated very irregularly throughout the gland. There was in his judgment a true sclerosis of the glands With the exception of a single instance not any of the thirty glands showed such a sclero sis There was no difference in the amount of connective tissue in the glands of the first series as compared with those of the second It would be very difficult to understand how in a few days this fibrosis could develop. The only case in my series with septa larger than in the normal gland was one which had re ceived several X ray treatments which may have been the cause of the increased stroma

The blood vessels and lymphatics were much less evident in Rienhoff's cases after Plummer's treatment being collapsed by the pressure of the distended acim Cattell too saw a decrease in vascularity according to him caused by endarteritis. We are not able to corroborate any of these observations With A Kocher we believe that it is nearly impos sible to estimate the vascularity of the living gland from the appearance of the microscopic sections The amount of blood in the capil larges depends on the succession of lightion of the blood vessels There will be congestion if the veins have been ligated previous to the arteries an emia if the arteries have been first hgated It is likely that Rienhoff removed the sections for biopsy without ligation and made the resection of the gland after ligation of the thyroid arteries The capillanes were in both of our series very well filled and no difference could be noticed I was unable to corroborate Cattell's description of endarteritis

In Rienhoft's material, the lymphocytic in filtration was much less pronounced than in the cases in which Lugol's solution had not been given and the areas that were present seemed to be markedly reduced in size our first series in which iodine was not eixen we found glands without 5 with few and 23 with many groups of lymphocytes. In the gland removed after Plummer's treatment we found to glands without 7 with few and 13 with abundant lymphocytic infiltration This would mean a slight but distinct differ ence between the two series By far the most pronounced change which Rienhoff observed after rodine medication was in the appearance of the colloid. It was abundant distended the acini to their capacity, and stained uniformly throughout In some glands Rienhoff saw large colloid cysts and localized areas of very much dilated acini encapsulated with compressed parenchyma indistinguishable from the o called adenomata which in his opinion developed during the Plummer treatment

If we discard one case which received Lugol's solution for only 3 days we found in 84 per cent of the glands removed after iodine medication a definite change in the amount and consistence of the colloid. Not only the large follicles but also the small ones were tilled with a refractive evenly and deeply stained substance. Compared with sections of glands removed without iodine medication this change of the colloid is so definite and so consistent that we feel justified in regarding it as the result to f the iodine medication as the result to f the iodine medication.

However we mut not overlook the fact that in 16 per cent this change was missing and this was true not in patients as Gordano and Cattell believel without clinical improvement but in patients who showed a definite remission of the toxic symptoms after administration of todium. The problem is still more complicated by the fact that one gland had thick colloid but there was no clinical improvement.

In o per cent of the glands of our first sense, the colloid had a thek consistency although we are sure that the patients had not received any iodine in the ho pital. Still we have the suspicion that these cases received iodine in some form before entering, the claim. One patient admitted that he had taken medicine

at home another was treated by an internst after the I lummer treatment was generally accepted by the profession. Two of those cases in which thick colloid was found through out the gland died a short time after the oper ation of an acute thyrotoxicosis. These na tients were not regarded as bad operative ri ks and were prepared only by a short period of rest 2 and 5 days respectively. We are wondering if these patients did not receive toding before admission to the hospital and thus simulated a mild case on account of a regression of the toxic symptoms Lahey called attention to the danger of giving jodine without the knowledge of the surgeon thus making it impossible for him to recognize the seventy of the disease

In two patients in our first eries who had received bromides for 12 days well stained refractive colloid was present in the gland. This can be explained perhaps by Fellenberg's analysis of the officinal salts of bromide which contain a considerable amount of jodine

Less evident and only secondary to the quality of the colloid were the changes of the epithelial cells after administration of jodine. The columnar form of epithelium prevailed in 42 per cent of the lugoized glands as compared to 59 per cent of the unprepared Cuboidal cells were found in 55 per cent of the glands removed after Plummer's treat ment and in 40 per cent of the controls. In 82 per cent of the glands of the second sense many high papillations were present as against 70 per cent in the first series.

Still less marked was the difference in the desquamation of the epithelial lining, of the acms between the glands removed after and those without sodine treatment. Twenty four of the lugohzed glands showed pronounced desquamation as compared to 33 3 pcr cent in the first series.

Rienhoff on the contrary found the majority of actin lined with flat cuboidal cell which seemed inactive and shrunken. The nuclei were pyknotic and no actin were filled with desquamated cells

SUMMARY

Thirty exophthalmic goiters removed after Plummer's treatment were compared with

thirty glands removed without previous jodine medication. Most of the observations described by I tenhoff could not be contirmed After Plummer's treatment no changes in the vascularity and in the amount of fibrous tissue were found. The acini were not round smooth walled and of regular size and form Neither was the epithelium flat cuboid il nor were the nuclei small irregular and pak notic A formation of adenoma like tumefac tions and colloid exists visible with the unaided eve did not occur in our material. In 84 per cent of our glands removed after Plummer s treatment the only definite difference as compared to untreated cases was found in the appearance of the colloid. The acini of these glands had more and higher concentrated con tent in spite of the fact that the hyperplastic character of the glands was not altered

These findings corroborate Albert Kocher's observation that most of the Basedow Alands removed after jodine medication show dis tinctly more strained colloid than those with

Therefore if we regard the hquefaction of the colloid as the most characteristic feature of the exopthalmic goiter we doubt that the change in the amount and quality of the colloid which follows Plummer's treatment explains the clinical improvement completely The fact that in our material four cases im proved very well on Lugol's solution but did not show thick colloid in the clands, and that one case did not improve on jodine but had a gland rich in concentrated colloid suggests that this problem is much more complicated and will not be solved by the anatomical method alone

NEWER ASPECTS OF LIVER DISEASE¹

BY EDMUND ANDREWS M.D. WILLIAM A TIDMAS M.D. AND KARL SCHLEGFI CHICAGO I m th Dep tm t fS g ry U ty fill Clic fMd

A BOUT a hundred million years ago biol ogists tell us cells began to succeed better in life's battles by joining to gether for the common purpose of finding and assimilating food Since then there has de veloped a progressive specialization of the eells in multicellular organisms to an extent that is seldom realized. The interdependence of the e cells has become such that none is able to live alone in fact one of the triumphs of modern science has been the artificial re toration of conditions approximating those of life close enough to permit such survival This specialization has become so extreme that most cells have but one function gland cells excrete for the most part specific sub stances such as mucus thyroxin skin cells only make their contribution of keratin and die others conduct nerve impulses The whole life of the majority of our cells is of this type They are mere machines which perform very limited functions and have to be fed and cared for as well as controlled by other less differentiated cells

It is as such a mass of undifferentiated cells that we may look upon the liver. We used to hear a good deal about the function of the liver Much searching for specific functions was done with but little result. A few years ago the word glycogenesis would have pretty well summed up our ideas on liver functions Now we know that it is concerned in nearly all fundamental vital processes and its functions are manifold. We should then look on the liver from the opposite stand point It has no function necessarily to serve other cells Other organs serve it It is really the liver in a punning sense. It merely lives as an undifferentiated set of cells which have withstood the tendency to special ization and are concerned mainly with the most fundamental physiological process the assimilation of nutrition

With this biological conception in mind let us turn to a matter which has been of supreme interest to modern biologists and which makes up a large share of the general biological liter ature of the day I refer to cell permeability

in relation to the mineral salt content. It has been demonstrated by a very large number of workers that the concentration of the ions of calcium as opposed to those of sodium and potassium has a very delicate balance which has to be maintained with great exactitude in order to support life. If the number of calcium ions in the media is increased there will be a so called freezing of the cell and it becomes impermeable. It is no longer able to pass material in and out of its cell membrane no food is absorbed and it passes into a quiescent state. If the sodium or potassium ions are increased the opposite takes place Hermeability is increased activity of all sorts is hastened and if the process is carried too far cell dissolution takes place and it falls to pieces from too great permeability of its covering membranes

discuss the clinical aspects of liver disease as seen by surgeons. These may be classified under three headings (1) parenchy matous degenerations due to obstruction of the bile ducts (2) similar changes of lesser degree following ether or chloroform anasthesia (3) hepatitis inflammatory degenerations due to infection from the gall bladder or other foci in the portal circulation. In the same general category on the medical side are cirrhotic diseases eclampsia and anaphylactic shock This entire group are marked by a neculiar train of symptoms vague but none the less definite The group is characterized by falling blood pressure slowing of the pulse (except in the more acute cases) itching disturbance

Bearing these points in mind we will now

unless it is counteracted by glucose injections. Urea formation ceases aric acid is increased but not to touc levels as it is rapidly exercted. The mino acids in the blood are increased but also not to touc levels. These are the only changes of any possible significance noted in such animals but nevertheless the animals all die in a few hours and the cause of death is utterly unknown. However it is certainly not any thing like what we miscall hepatic insufficiency in the clinic.

For a long time it has been supposed that in rundice and other liver diseases the touc agents were the bile salts salts of taurocholic and gly cocholic acid. To them was attributed the itching renal irritation and albuminuma falling blood pressure etc Recently Rown tree and Greene have made a brilliant senes of studies on this subject which appear to be conclusive and to prove that there is no rela tion between the concentration of bile salts in the blood and the symptoms of jaundice and hepatitis Increased bleeding time itch ing and jaundice are all shown to occur both with normal and with increased bile salt con centration and the injection of the salts into animals far beyond any amounts met clin ically fail to produce these symptoms

Amino acids as a cause of tovermas have been studied by Neuman and Marsh with the result that they too can be ruled out com pletely as a cause of tovic phenomens. Amounts varying from two to four grams per kilo were injected and in none of them except histidine was any tovic effect evident. These amounts are overwhelming compared, with

and they have proved that these substances do not occur in amounts large enough to be toxic

Theevidence then issofurentirely negative. We can say with assurance that the cause of the symptoms of jaundice etc. is not bile salts bile pigments not glycogen starvation not polypeptids not amino acids. There is not much left. Still these symptoms do occur and they must be due to some town arising in the liver as they are absent after hepatectomy.

Our first lead along this line arose from the work of Mason. He recently published the fact that if small amounts of liver were cut off and dropped back into the dog's abdomen a rapidly fatal tovernia ensued. A few grams were sufficient to cause death within as to 24 hours. In his animals, the tovarma was marked by a fall in the concentration of the serum and plasma. Increased congulation time increased fibrin in the blood, and increased uric acid.

These experiments have been criticized on the assumption that this procedure killed the dogs by producing a pentonitis but we have repeated them inserting the bits of liver into the chest and into the axilla and have had the same results. Mason thought that the tone fraction was in the non protein introgen fraction but the results are not positive.

It is obvious therefore that there is a substance in the liver which can cause severe toxemias and with this in view we undertook a study of the liver proteins as they seemed to be the only substances not yet accounted for In the first place in some experiments already reported by Peterson and Andrews it was shown that in totally exiscerated animals injection of large amounts of bacillus coli toxin which ordinarily causes a heavy albu minuna had no such results in the absence of the liver Shock chills and fever ordinarily provoked by such injections were conspicuous by their absence This finding seemed ad ditional evidence that some liver protein was at fault

EXPERIMENT 1L

The proteins in the urine of dogs with hepatic disease were studied immunologically by the following method. The common bile

ducts were tied and the urine collected to a daily in the studies on obstructive jounds. In those on ether torumias female dowere catheticized deeply intoricited we ether for to 3 hours and samples of uritakin every few minutes. In each case the critical samples showing albumin were saverand the proteins studied.

Antisera were prepared against dog bloby the method previously described by which would react to dog blood in dilutio of 1 1 000 000 Next dog livers were perfus until the perfusate was protein free groun and extracted and antisera prepared whi were sensitive to 1 100 000 against dog live Of course the liver antiserum was also high potent for blood as it is impossible to wash. the blood out of the liver. In both the jau diced and etherized unimals the early spec mens of urinary protein gave reactions in his dilutions to liver antiserum and none to bloom antiserum. This may be regarded as pro positive that this urinary protein originate in the liver. In later specimens, there al followed the excretion of large amounts blood protein Next studies of the mineral salt conte

of normal and pathological livers were unde These results are being published in extenso elsewhere but we may say he that in dogs in which the common bile duc have been ligated and severed there is profound fall in the calcium in the live Normal dog livers analyzed in our labor tory have a calcium content very close 2 2 milligrams per gram of dried substance In jaundiced animals it falls to 180 to 19 milligrams This represents a change which per se without assuming any tovemia sufficient to bring about a disintegration of cells and a leakage of the normal cell conten into the circulation While there is but sligh variation in the potassium contents of suc livers the increase of the sodium ion enormous and amply accounts for the co dissolution which microscopic studies show t take place

DISCUSSION

It is vell known that proteins that ar foreign to the blood are promptly excreted b the kidney. This has been shown to be true for egg albumen and serum proteins of other pecies. In our laboratory it was demon strated by MacDonald in experiments bearing much more closely on this problem. He in jected a mixture of dog blood and liver pro terus into dogs and found that the blood pro tein was held back and the liver proteins were exercted in large amounts

What then is the mechanism of this albu minuria? It is clear that for some reason as we have shown protein pas es from the liver and makes its way into the blood where it is excreted as foreign protein. Why does it leave the liver. It is all probability bound up with change in the permeability of the liver cells due to a disturbance in the mineral salt balance which I discussed earlier in this

In a recent communication one of us suggested that in urimia such a mechanism wa acting The recent use of overwhelming doses of calcium as employed by Walters and others in the treatment of jaundice is a striking confirmation of this theory especially as the clinical results have been found to he so excellent

CONCLUSION

- A protein from the liver is passed in the urine in the early stages of certain hepatic discusses
- 2 This leakage of protein from the liver is due to a disturbance of the mineral salt halance

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CANCER OF THE CERVIX UTERI

Its Surgical Treatment and Critical Essential to the Establishment of a Prognosis Following Operation¹

BY KALL H. MARTZLOFF, M.D. FACS, PORTLAND OREGON

ROM a review of the literature of the past few years one might well conclude that surgers in so far as it has been applied to enteer of the cervix utern is wellingh passe. The almost hysterical rush of many of our foremost American and Furopean colleagues to forsake surgery for the charms of radiotherapeutic measures is sufficient to arouse more than passing interest Indeed the stampede to radiotherapy immediately warms us that all is not well with surgery as it concerns cancer of the cervix uter.

One notes with concern the formation of well defined groups of protagonists those favoring surgery only in apparently operable cases of cancer of the cervix utera those favor ing radium and deep \ ray therapy as the only remedial procedure in all cases and hap pily a third group who realize that there probably is virtue in both procedures and are trying to solve the problem in a quiet delib erate and unbiased manner. It is from the latter group that we will ultimately obtain information of permanent and constructive value Such observations require a period of 8 to 10 years in clinics where the work is carried on by a small group of competent in dividuals according to a well formulated plan which should include the collaboration of one versed in pathology so that tissue correctly obtained as well as properly fixed cut and stained may be studied and filed away for future reference

Argumentation and partisanship rarely lead to correct scientific deduction indeed they tend to obscure one s vision and defeat the purpose of investigation which is merely the ascertaining of facts whatever they may be The purpose of this paper therefore is not to present surgery as applied to cancer of the cervix uteri in a light which may appear to belittle other therapeutic agents rather we propose to analyze critically some phases of

cervical cancer treated by surgery in order that we may more fully appreciate its advantages as well as its limitations and the cause therefor. In a similar way we may also obtain a more accurate method of comparing results in patients treated with radium and X rays.

A consideration of surgery as properly applied to cancer of the cervix uten involves two factors first a proper selection of patients for operation and second an adequately performed operation by one experienced in this type of surgery

SELECTION OF PATIENTS FOR OPERATION

What constitutes the borderline between operable and inoperable cancer of the cervix uten is in a large measure a matter of individual interpretation. A study of the material from 290 patients who were operated upon at the Johns Hopkins Hospital prior to the year 190 as well as studies in other climes has yielded some definite criteria to govern us in deciding clinically whether or not a given patient comes within the scope of operability. By operability is meant that the condition is such that on the basis of experience a perma nent cure may reasonably be expected.

Extension of the cancer to the rectum bladder or paracervical tissues in our expe rience and the experience of numerous others precludes the possibility of a permanent cure If the cancer extends on to the vaginal wall to a point which makes it impossible to re move the growth and still leave a macro scopically normal margin of at least meters local recurrence will almost inevitably Regional lymph gland involvement and ureteral obstruction originating in the cervical parametrium in our experience like wise prevent permanent cure by operation Occasionally a patient with the first complica tion may live as long as 8 to 10 years before recurrence proves fatal

Another factor of importance in helping us

to determine whether a patient should be operated upon is the length of time she has had the neoplastic disease. The history of the duration of the symptoms of bleeding or ab normal vaginal discharge will help to deter mine this point although obviously such a determination is crude and inaccurate. How ever from the experience cained at the Johns Hopkins Hospital it would seem that in the epidermoid variety of cancer a history of symptoms of more than 8 months duration is in itself generally sufficient to put the patient beyond the hope of cure from opera tion no matter what the pre operative clinical findings have been Unque tionably will occa ionally be an exception but it will probably be safer to accept this rather than most clinical generalizations

It is es ential to determine clinically before operation whether all of the foregoing contra indications to surgical intervention exist. It is possible by bimanual vaginal and rectal examinations vaginal rectal and bladder visualization as well as pyelography to determine all of the foregoing factors except the namely regional lymph gland and primetrial extension of the disease. It should be stated too that if the neophem has not actually involved the bladder mucosy it is difficult to interpret iccurately the bladder findings by means of the systoscope.

If by any chince the patient is so emucrated that the exploring finger in the pelvis detects palpable and adherent that or obturator glands then the local process is so well advanced that it is manifestly not use to oper ate. Generally gland involvement cannot be determined before operation.

The clinical determination of involvement of the cervical parametrium however presents a most important and as yet rather in surmountable obside to the accurate clinical appraisal of the neoplastic dissemination. If the uterus is fixed and the vaginal vault and cardinal ligaments are densely hard the inference of parametrical infiltration in motical establishment of the parametrical infiltration in motical establishment of the parametrical infiltration in fixation light induration of one or both lateral valual fornices and moderate or slight but never theless definite parametrical induration what

then is the correct interpretation? The an swer is difficult and not forthcoming

In the material at the Johns Hopkins Hopkins Hopkins pital paracer real induration was noted to pital paracer real induration was noted to times in 90 patients operated upon an 1 cidence of 36 8 per cent of 107 the broad la ment neutros 58 8 per cent of 107 the broad la ment induration signified carenomatous extension in 31 88 per cent it did not signify cancel and in 13 12 1 per cent the finding occurred where the histolo₈ ical extension was debat able

On the other hand amone 9 patients with histological extension of cancer to the para cervical fissue in alion broad ligament induration as sought for 03 68.4 per cent revealed induration while 29 31.5 per cent did not In brief about one third of the patients with broad ligament extension of the cancer gave no demonstrable chinical evidence of it while about two thirds did. Again of the 100 patient operated upon who had clinical broad ligament induration not quite two thirds showed paracervical histological invasion of the cancer.

From these figures the rough generalization to then possibly permissible that broad it ament induration signifies paracerical carano mitous extension in about two thirds of the patients who otherwise are considered good operable risks

TECHNIQUE

The second factor of importance in the application of surgery to cancer of the cervix uters is an adequately performed operation

There is general agreement among ginero of the cervic uter involves not impless that an adequate operation for cincer of the cervic uter involves not impless than a panhysterectomy with removal of the proving one third to one half of the vagua and a wide parametrial dissection which is possible only after the ureters have been demonstrated and mobilized for their distal to centimeters or more. Considerable difference of opinion crusts as to re-lonal gland extripation. Its a result three groups of operators exist each using one of the following procedures.

1 Routine extirpation of iliac and obturator glands This is the procedure originally ad vocated by Ries in 1895 At the present time



II i Normal cervical epith hum

Vietor Bonney of London is the active exponent of this procedure. In the United State C. Jeff Miller and Howard C. Faylor' if they operate utilize this procedure which was also used by Bumm. Doederlein and Zweifel in Germany.

2 Futrpation of regional limph glands only len pathably enlarged This is the procedure advocated by the late Ernst Wertheim his pupil Weibel and many others. In the United State Graves 1 Spalding 1 and Cobb advocate 1 similar procedure.

3 Non remo al of regional lymph glands Most go necologists who now operate for can cer in this location follow this method Cullen is its outstanding exponent. He operates in all operable cases. Among others who do like wise may be mentioned Peterson of Michigan Davis of Harvard and Hartmann of lans.

It is difficult to find a rational explanation for three such divergent points of view and practices There is however excellent reason for two of the methods namely the first and third

Regarding the routine extirpation of re gional pelvic lymph glands the altogether logical explanation is that this is the correct operative procedure in all cases of cancer in which the regional lymph nodes are accessible Against this practice may be noted (1) the increased primary operative mortality (2) the

These geo o this mile f



Fig 2 Spinal cell cancer with an epithelial pearl

involvement of inneeessible lateral nortic glands in certain cases in which lymph node metastases exist (3) the comparative in ability to effect permanent cures in patients with lymph gland metastases. The expenence at the Johns Hopkins Hospital reveals that none of the patients with lymph gland metas tases was permanently eured. However 7 per cent of those with lymph gland metas tases (as shown by microscopic examination of extirpated glands) were free of recurrence at the end of 5 years. The experiences of Weibel (16) Wertheim (17) and Rosthorn (reported by Schottlaender and Kermauner 14) are virtually the same. Weibel does not believe that removal of eancerous lymph glands produces any important increase in the 5 year cures

On the basis of the foregoing we feel that the operation fulfilling the minimal operative requirements previously given with nonremoval of the regional lymph glands has a rational basis for the surgical treatment of this disease

There is probably not much to recommend the procedure of extirpating only enlarged lymph glunds for these may be merely in flammatory hyperplasms while glands which are scircely palpable may be completely occupied by cureinomatous metastases

TABLE I PERICERVICAL INDURATION AND ITS SIGNIFICANCE

TABLE II TEPICETATE INCIDENCE OF PERI CANCEL AND THE INCIDENCE OF PERI CERVICAL LADERATION ACCOMPANIANCE IT

A recent report (10 6) by Victor Bonnes (4) of London is decidedly at anance with the experience at Johns Hopkins and other clinic and it challenges attention. Bonnes practices routine extripation of the thic and obturator it mph nodes. Ymong 130 pittents who were operated upon 10 or more vears ago to showed lymph gland metastases Of these it (2 per cent of 50 are free of recurrence and on the basis of this Bonney continue lymph gland extripation.

titesth sia. With a primary mortality varying from 4 to o per cent in this operation every phise of the operative technique has

received close scrutiny

Surgical anasthesia is an integral part of the operative technique for cancer and it probably is not an exaggeration to say that in the last decade and a half greater advance ments have been made in the refinements of anasthesia than have been made in the funda mentals of surgical technique as employed in the for most clinics Particularly in America the cradle of ether anæsthesia has advance ment been made in the technique of inhalation narcosis The correct employment of ethy lene carbon dioxide oxygen mixture with min imal amounts of ether is destined I am certain to lower materially the primary mor tality in radical operations for cancer of the cervix uteri

Ethylene an esthesia permits perfect relavation At the end of a difficult // hour opera

tion not complicated by excessive hamor things the patient is in excellent conditional fact which cannot be appreciated by any but those who have actually experienced the situation. Instead of the customary pale claim with tacherachia and marked viscular hypotension one sees a warm pink patient with only slight a celeration of pulse and a blood pressure little altered from what it was prorto operation. By the time she has been returned to but shi is consistous and in an hour to two cun easily engage in intelly the construction.

In England and on the Continent where inhilation narcosis in most clinics i produced with chloroform and chloroform ether mix tures the operators have sought refuge in the injection of anæsthetic olutions particularly in spinal anasthesia. This procedure in expert hands according to Doederlein produces a mortality of less than o r per cent Its em ployment is considered by Bonney to be a large factor in his decreased operative mor tality of 1 per cent Suessmann (15) has re duced his initial mortality to 3 5 per cent in 168 patients on whom radical operations were done and spinal anasthesia was used while Weibel (16) reports 2 4 2 per cent mortality in 48 personal cases operated upon

Operatic mortality. Without going into tedious detail a word may be said about operative mortality as it concerns the radical operation. Table III is self explanators and reveals the pre-ent distribution of mortality.

in different clinics

When one considers that in some chimoperative shock is one of the mot frequent single causes of death at operation it is apparent that the previously noted improvements in an isthesia are necessary and should reflect a delimite reduction in the operative mortality due to shock.

In the Johns Hopkins Hosmid up to 1919 2 per cent of the operatic e deaths were due to surgical shock. From 1920 to 19 6 inclusive only one operative death due to shock of curred. It is safe to say that the admini tration of anisthesia by trained anisethetists has been an important factor not only in the improvement but also in lessening other post.

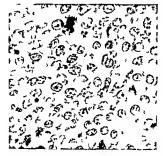


Fig 3 Transitional cell cancer

operative complications such as abdominal distention (6)

CRITERIA FOR PROCNOSIS

Two types of prognoses are often desired by patients and more particularly by the immediate family viz (1) the outlook as to the patient's ability to withstand the immediate operative procedure and (2) the possibility of an ultimate cure provided the patient survives operation

The first query can be immediately an swered. In correctly selected pritents who are properly prepared for operation an operative mortality of not over 3 to 6 per cent should be anticipated. In comparatively early cases in which the disease is limited to the cervix a mortality not over 1 to 9 per cent should occur. This may appear at variance with some of the figures in Table III. However in numerous instances these figures represent operations performed on patients who presented local processes technically most questionably operable while the patients them selves were poor operative risks.

The second request to look into the future cannot be met until the operation is over and the pathological specimen is subjected to ade quate microscopic examination. An adequate examination entails the study of numerous celloidon or parafiin microsections obtained from blocks representing all the cervical para metrum which is cut at right angles to the

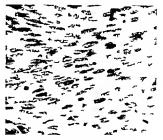


Fig 4 Spindle cell cancer

longitudinal axis of the cervix the entire length and anteroposterior thickness of the vaginal cuff cervix and the corpus uteri to a point well beyond its macroscopic involve ment. The adness should also be sectioned

A study of this tissue should determine the extent of the local neoplastic invision the variety of cuncer (whether adenocarcinoma or epidermoid carcinoma) and if an epider moid cancer the predominant type of cancer cell. With these data available a prognosis can be given as to the anticipation of an ultimate cure with a reasonable degree of accuracy. To lend meaning to such data it has been necessary to make a critical analysis of many pathological specimens and finally to

TABLE III SHOWING THE TREND OF PRIMARY
OPERATIVE MORTALITY FOLLOWING OPERATION FOR CARCINONA OF THE CERTIL

DILLI	
	P t
Cullen of Johns Hopkins	6 to go
†Spald ng of Stanford	115
† Miller of Tulane	70
Lynch of C liferma	66
fGraves of Harvard	4 5
Davis of Harvard	9.3
Clark of P nnsvl ania	60
Peterson of Wich gan	6 6
Ronney	1 0
Wertheim	80
†Doederlein	20 7
Suessmann Zweifel	3
Nebel	49
Weider	4 2

Practice routine removal of regional lymph gland when operating

Use rad um practically exclusively

TABLE 1 PERICERVICAL INDURATION AND
ITS SIGNIFIC ANCE

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studying a small series of cases operated upon also finds a distinctly more favorable outcome in the spiral cell cancers. Schottlaender and kermauner (14) studying Rosthorn's operative material conclude (p. 680) that among the epidermoid cancers the unripe variety corresponding to our transitional and spindle cell types show a greater degree of invariences. This we have also shown

Concerning the use of radium Schmitz (13) Cordua (5) and Pomerov and Strauss (15) obtain their best results in the differentiated or more mature type of cancers (correspond ing to our spinal cell type) while Boehm and Zweifel (3) obtain their most favorable results in the immature type of cancers (correspond ing to our transitional and spindle cell types) In other words the results from the use of radium in so far as cell type is concerned are conflicting although the authors agree that there is a difference in the manner in which the various types react to radium. The latter point is well developed by Alter (1) in his care ful histological studies of cervical cancer treated by radiation The question naturally arises as to whether or not certain fairly def mite criteria can be established which will make it possible with such recent distinct ad vance in our knowledge concerning the varia tions in malignancy of this type of cancer to forecast with a reasonable degree of certainty the prospect for cure following operation for cancer of the cervix Obviously any method de igned to establish prognostic criteria pos se ses inherent limitations that with our pres ent knowledge are insurmountable and we fully realize that any scheme for prognosis when applied to an individual case may prove untenable

We have studied only patients suffering from unmistakable carcinoma of the cervix uten on whom panhysterectomies were per formed that fulfilled the minimal operative requirements previously noted

This analysis (9) concerns 145 patients in the Gynecological Service of the Johns Hopkins Hospital who were operated upon during the 7 year period between 1893 and 19 o and they fulfill the following criteria (1) they were all operated on (2) they all survived the operation and left the hospital alive (3) their

present status is known except in the case of some who have been lost after being traced a years

We believe that the necessity for such a selection of cases is apparent when one reflects that we are trying to ascertain what importance if any various factors possess for determining the ultimate outcome following operation in a given group of carcinomata. For the present, then we are not concurred with operative mortality, but with the problem of whether or not criteria can be established that will enable us within reasonable limitations to forecast what the outcome may be in a patient who has survived the hazard of an operation.

To appreciate better the possible influence of the various factors that may possibly play a part in the determination of a prognosis each group of cancers was studied separately

SPINAL CELL CANCER

In the spinal cell group we have included all of the cases in which the spinal cell type of cell is predominant irrespective of its combination with cells of other morphology. The cells characterizing this variety of cancer are morphologically similar to cells seen in the superficial zone of the stratum mucosum of normal stratified cervical epithelium (Lig 1). The cancer cells are usually polyhedral in shape with well defined cell outlines. The nuclei many of which possess nucleoli take only a moderately intense hematoxylin stain and are separated from each other by an abundant quantity of surrounding cytoplasm which is only lightly stained by eosin (Fig 2).

In this group are included 30 patients and of 28 the present status is known. The two exceptions are one patient who was followed for 6 years after operation and the other for 10 months after which they could not be traced

In Table V are tabulated the cases of spiral cell cancer the salient data only being recorded. In this table as well as the subsequent tables of this type the data on the extent of cervical involvement have been omitted to lessen their size.

All patients in this group not otherwise re corded are dead death with two exceptions TABLE IV PERCENTIGE INCIDENCE OF FIVE VAIR CULFS FOR THE DIFFERENT TALES OF EPIDERMOID CANCEP OF THE CERTIN

correlate the findings with carefully obtained and pre-cryed case record

On the bist of such a study (7 8) it his been hown that cancer of the cervix uter varies greatly in its miligrance. To recapitulate briefly a study of the pathological mate rial from 36 yet es of cancer of the cervix uters at the Johns Hopkins Hospital reveiled that a de from the udenocarcinomata the cidermoid cancers could be divided into three large groups each being designated accordin to the type of cancer cell predom nating. There were necessarily various combinations of cell types encountered but it was found that the predominant variety of cancer cell indicated the relative malignance of the individual process.

As a working classification then we have (1) pinal cell cancer (1) transitional cell cancer and (1) pinalle cell cancer

To illustrate the distinct variation in malignancy of cancer of the cervix uten the relative frequency of so called 5 year cures (as given in our linst paper occurring, in each of the types of cancer as grouped above) is given in Table IV wherein are also compared the results obtained at the Mayo Clinic as reported by Broder

The rc ult as shown in Table IV are so closely comparable as to stimulate skeptical peculation. However, it is worthy of consideration that the work in I ochester and in Baltimore was carried on independently and without knowledge on the part of either in vestigator that such work was in progres, else where

This of itself practically refute Plants (a) statement and inferences that it is impossible to have pathologists agree on a few charac teristic cell types in carcinoma of the cervix uter 1s was shown in our first paper (2) numerous combinations of cell types occurred in our study so many in fact that for the ake of clearness ome were not enumerated. How ever in practically all instances where a suffi cient number of well cut and stained celloidon or paraffin sections were studied it was po sible to determine the predominant type of cancer cell Naturally in some specimens it was impossible to be certain which was the predominant cell and particularly intri un were those on es in which one could not sairs factority decide whether certain predominant cells should be classified as spinal or transtional any confusion that arose was practically confined to these two group for it i readily seen that when for example a well defined cell membrane is not visible about a cell that would otherwise conform to our de scription of pural cell we would then be forced either to e tiblish another group (which was done at first in that way segregating all these doubtful cases) or to include them in the spanal or tran ational cell groups. The latter course was adopted when the material from our study was grouped and classified. To one experienced in this type of work it is at once obvious that the transitional cell classification would become the large dumping ground for doubtful cell types for it is the tran itional cell group that takes in all the varie ated forms that do not conform to the spinal or nudle cell description

It is all of quite obvious to patholo rist that the classification or de cription of all the numerous cell form seen in cancer would be an endless if not an impossible and it less task. For this reason we had to confine our study to the predominating cell types in order to see what such an investigation might offer this is shown in Table IV.

While Flaut attempts to compare his to sults with ours he does not tress the important fact that his cases have all been treated by radiation while ours were treated by radical operation a fundamental difference. On the other hand Pemberton (10) the greater the involvement in thickness, the more likely is pericervical dissemination to

occur

In Table VI we have tabulated the extent of cervical thickness involvement in the pa tients who had spinal cell cancer but who are now in good health. The results appear to emphasize the apparent unimportance of the extent of cervical involvement provided no pericervical dissemination occurs

Type of operation performed Rudical pan hysterectomy through the abdominal civity was the operation performed on , 18,, per cent) of these patients. Viginal panhy terce tomy was performed on 4 (13 3 per cent) and a combined vaginal and abdominal operation

on one (3 3 per eent)

Of the patients who had the abdomind operations performed 12 (48 per cent) ire living and well One (25 per cent) of the four who had a vaginal panhy sterectomy performed is living while the only patient in this group who had a combined operation is now in good

health Duration of symptoms What part the dura tion of symptoms plays in our scheme of attempting to foretell the ultimate outcome in a given group of cases is probably difficult to estimate in the spinal cell group of cancers We are arbitrarily selecting the eighth month of symptoms as the point beyond which a cure cannot be reasonably expected. How ever in only 5 patients in this group were the symptoms of more than 5 months dur ition and 2 of these 5 had none of the extensions that would ordinarily constr un us to consider them inoperable. It is then obvious that were there more patients in this group of cancers our data might be different Tully appreciat ing the shortcomings involved we have on the basis of our data taken a symptom dura tion of 8 months as the time limit beyond which an operative cure for spinal cell cancer may not be anticipated

Diagnostic cureffage For years it has been a routine procedure at the Johns Hopkins Hospital to obtain tissue for microscopic ex amination before the radical operation is per formed The custom now is to examine frozen sections before we proceed with the extirpa tion It happens occasionally that in some

SHOWING INVOLVEMENT OF CEIVIN I V TARLY VI AT DIFFERENT I FRIODS OF DISFASE IN PA TIFNES WHO HAD SLINAL CELL CANCERS AND APP NOW LIVING AND WELL

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4	ı	0	2
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8	0	0	I
Total	(14)	4 (85%)	915 (2)

TABLE VII CURFU PATIENTS IN SPINAL CELI CLOUP

(, 001	∖ mb	Pct
Fire y ar cur in path nt not neces anly operable I manual cur On while nations in this group	16 14 22	33 3 46 6
I rmanent cure in operate e group—14		63 6

curly cases the freezing method is not ade quate for the preparation of sections suf nciently thin to permit of a micro copie diagno is In such instances the patient is put back to bed and nothing further is done until rapidly prepared celloidin or paraffin sections are available for examination importance of obtaining tissue for examina tion prior to the radical operation cannot be sufficiently stressed for it has proved of value in two ways preventing on the one hand a serious operation where no eancer exists and on the other occasionally revenling cancer where none was suspected (Cullen)

Diagnostic curettage several days prior to the radical operation was performed on 10 (33 per cent) of these patients Three of these may be classified as cured so that of the 14 cured patients we did a preliminary curet

tage on 3 (2 r 4 per cent)

Cured patients Five year cures so called are therefore seen to have been effected in 16 patients (55 3 per cent of 30) in the spinal cell group and permanent cures in 46 6 per cent However in analyzing Table II more carefully it will be noted that of the 30 pa tients forming this group, in 4 there was a definite pericervical extension. One not in cluded in the four just mentioned had iliac gland metastases and three others not in cluded were beyond the eighth month of

TABLE A -- SPINAL CLIL CANCER

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being due to the sequel c of cancer and occur ring not later than wear after operation

In studying Table V one is immediately impressed by two outstanding figures first the regrettably small number of case and second the occurrence of cured patients. If one war to plot a curve of the cure in relation to the duration of symptoms before operation one might conclude that it is just as well to operate late in the disease in spinal cell cancer as to inter one during its incipiency. Such a deduction would not be justifiable but nevertheless one, cannot but be impressed by the high incidence of patients who are living and well in the group in which the symptoms were of a duration of x to 8 months.

Metastases None of the patients in this proup with demonstrable metastases ha e re mained well all dving of recurrence although one patient with symptoms of 12 months duration and metastase to the thre glands lived 8 years before succumbing to a recur

Extension into the pericer roal trisines. All pritents with definite extension of the neo plusm into the pericervical tissue and we include one extension to the bludder and recum have died of recurrent cancer but if the extension was questionable as occurred in two instances the patients are still in good health. Four (1, 3, per cent) of these patients showed histological evidence of cancer extending be yond the radial confines of the cervire.

Extension to the uterus occurred in eight instances (4 2 per cent) and in three of these

137 5 per cent of 8) the patients are well so that in this group of cancers in assion of the corpus uter is not incompatible with operative cure. However a more critical analysis of this particular phase is even more relevant and shows that an operative cure of 60 per cent occurred in thoe in whom extension to the uterus was uncomplicated by pencervical extension of the disease.

It would appear therefore that in carcino matous extension from concer of the cervit that which is confined to the uterus is of less serious import. On the other hand escape of the uterus apparently improves the post operative prognosis for of the 14 patients who are cured in 11 (78 8 per cent) there was no extension to the uterus.

I aginot in of ement. In case the a hall involvement is not so exten in a sto be be void operative removil it appears that even a marked degree of it does not materially during the prognosis for of the 7 patients with extensive vaginal involvement 4 (57 per cent) are living and well. Of the 16 patients with only moderate valund involvement in , other extensions made operative cure im possible. Of the remaining 15 / (54 per cent) are well.

Extent of certical in ol ement. In this group of spinal cell cancers no definite relation can be shown between the extent of cervical in volvement and the incidence of ultimate cures. Such findings hardly appear logical especially if the entire thickness is involved for it would seem reasonable to as ume that

TABLE IN SUMMARIZING THE PATHENTS WHO CAME TO THE JOHNS HOLKINS HOSH IN DURING THE FILST SIN MONTHS OF HIGH IS SAMPTOMS IN ORDER TO SHOW THE INCIDENCE OF THE CASES AS THEY CAME TO THIS CLINIC AND THEIR COLLISIONOMY INCIDENCE OF BROAD HIGHMENT INVOLVE INCIDENCE OF BROAD HIGHMENT INVOLVE IN OUT AND THE TOTAL OF THE CASES OF THE CA

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Adenocarcinoma	19	6	2	31 5	3 3
(M tzl ff k H J	hn H	pk II p	Bu v	l o	1

THELE IN A LATIENTS WITH FRANCH ON AT TYPF OF CANCER WITH PERICERAL AL IN VOLVEMENT LIVING THREE AT ARS OR MORE AFTER OPERATION BEFORE EVENTUALLY DIALOG OF CANCER

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18	12	Entire	I ntire	٥	0
2 1	13	Entire	Intire	ō	ō

Ao vaginal involvement †I imited vaginal involvement

tious communication we drew attention to the frequency of early pericervical involvement in this group of cancers which is here reproduced in Table IN and this is igain borne out in this selected group of patients

The e patients with the exceptions noted in Table IV A all died within 2 years after operation

Vaginal in al ement was extensive in 4 patients of this group. Only 2 (8 3 per cent) of these however may be classed as cured in fact of the 18 patients who are well only 6 (36 6 per cent) showed cancerous in 1 sison of the vaginal the involvement in 4 (2 per cent) being not extensive while in 2 (11 1 per cent) the vaginal invasion was more widespread though removable.

TABLE \ SHOWING INVOLVEMENT OF THE CLRVIX IN THE CURED LATHENTS WITH TRANSITIONAL CELL (ANCEL

յք արլtա	Th k	(1	,
m th	Othd	r th t	Ł t
1	5	0	0
		0	0
4	2		0
5	O	1	1
ŧ	2	0	1
	0	0	1
10		0	0
	1 ((6/)	3 (166)	3 (166%)

The extent of cer real in of ement in relation to the cured patients is interesting in this group of cancers. In Table \(\sigma\) are grouped the cured patients to show the degree of cervical implication.

I rom this table it is readily seen that of the cured patients in this group twice as many hid one third or less of the cervical thickness involved in cancer as compared with those hiving more extensive involvement. These findings are considerably at variance with those for the spiral cell type of cancer and are sufficiently striking to suggest that radial cervical involvement may be an important factor in the determining of the operative cur ability of the transitional type of cancer.

This is all the more vividity brought out when one considers the number of cured patients occurring in each of the groups into which the thickness of cervical involvement is subdivided. Of 21 patients in whom one third or less of the cervical thickness was involved in cincer 1 (57 1 per cent) were cured. Of 23 patients who had two thirds of the radius of cervic invaded by cincer 3 (13 per cent) are well while of the 46 patients in whom the entire thickness was involved 3 (6 5 per cent) may be considered cured.

These figures lose their striking importance somewhat when one considers that during the first 8 months of the disease the incidence with which one third two thirds and the entire cervical thickness respectively were invaded was 95 86 and 65 per cent. However despite this the figures in the preceding paragraph remain of dominate importance.

Table XI brings out plainly the situation existing in the group of patients who were seen during the first 8 months of their symp

TABLE VIII -TRANSITIONAL CELL CANCER

∖mb (p		6	789	3 :
Note for the state of the state	6	7	8	5
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Ophi m				

their amptom before coming to operation Phese 8 patients according to our criteria were beyond the scope of a permanent opera tive cure

It would be reasonable then to say that of the 50 patients in the group of cancers 8 belonged to the inoperable class. Therefore of the remaining patients who were oper able 14 (63 6 per cent) are either ining and well or may reasonably be considered is operative cures.

TRANSITIONAL CELL CANCER

The tran itional cell cancer is by far the mo t common variety (grossly it does not liffer nor can it be distinguished from the other cancers in this situation. Microscop. ically however this tumor is distinctive its cells resembling somewhat a well defined zone of cells seen in normal cervical epithelium which is limited above by the characteristic spinal cell layer an I below by the distinctive single called hasal layer. Because of their resemblance to this intermediate group of cells we have designated this variety of can cer as the transitional cell type These cancer cells have a very faint or undefinable cell membrane The nuclei take a deep blue hema toxylin stain and are closely placed being senarated by a deep cosin staining cysto plasm much le s in quantity and more deeply struning than that in the spinal cells Nu cleoli are commonly ob erved (Fig. 3)

In Table VIII are tabulated the salient features regarding the patients having the transitional type of cancer Metastiscs to the three glinds were demonstrable in 4 patients of this group all but one duing in less than 5 year after operation. This patient who came for treatment in the ninth month of 5 implematic disease died years after operation. We was the only one of the four to have a diagnostic curetta e several days prior to operation for radical extigations of the process.

Metistises to the fallopian tub's were demonstrated twice in this group both of the patients dying of recurrent cancer though one who hid had symptoms for 3 months hid by years before succumbing 5 of the eyear being spent in complete comfort until the recurrence began to manifest itself.

In ol ement of the corpus uters by the cer vical cancer occurred in 17 instances (168 per cent) in the tran itional type of cancer but in contrast to our results in the pinal cell group none of these patients may be classified as cured Of the e 1, patients 3 lived two years or more following operation one 4 years one years and one 3 years the duration of their symptoms at the time of operation being respectively 5 9 and 4 months Of these 17 patients having exten sion of the cancer to the uterus 3 (176 per cent) had no associated pericervical involve ment This absence however did not eem toindicat a more favorable out ome in so far as an ultim te cure was concerned

Percer was xtension of the malign int process occurred in 37 in tances (41 per cent) thou h it was questionable in two. All of the c pa tients however died of cancer. In our pre

TABLE AND -SUNDLE CLU CANCIL

	3	4	5	6	7	8	9		8	4	
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Now fitt Et almit 11 gf 1 Fip toe 11 df 11 t P. volt											
Bi 11	0										
N kd g I I m t	1										
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L d b	-										
V mt t	4	-	_	-		-	_	-	-	-	

findings. Were it not for the exception just mentioned it would appear that every patient whose symptoms had extended over a period of 8 months or more before operation, was probably beyond the scope of an operative cure.

Cures Of the patients in this group 18 (oper cent) are living and well though these percentages could be ruised to 24 1f one were to consider cured those who died of natural causes or those that were lost after a period to years. This has not been done how ever these patients being grouped with those in the last column to swell the number of year cures which totals 30 patients (33 pet cent) and comprises those living and well as well as those living 5 or more years before dying or not being traceable

Percentage cure in operable patients. The question necessarily arises as to what the ultimate results would be in patients who may be considered in the light of our experience to come within the scope of operability. In this group of cancers it would appear from our indingisthat in addition to the criteria established for the spinal cell cancers one should add extension of the cancer to the corpusulten as one other factor indicating the possible improbability of an operative cure

Therefore if we consider inoperable in this group of cancers the 37 patients with period critical extensions of the growth 3 patients with uterine extensions and it with ovarian involvement not included in the previously mentioned 37 we have 44 patients (45 5 per cent) out of the 90 who are definitely beyond the scope of a permanent operative cure. If we may also consider any patient whose

symptoms are over 10 months in durition as being beyond operative rechamation we may add, more to the inoperable group making a total of 44 patients (48 8 per cent) out of cowho presumably were beyond the reach of an operative cure

f ymrt m

We may therefore reasonably consider 46 patients in this group to be operable. This then gives us a permanent operative cure in 18 patients or 39 i per cent of those whom we consider as coming within the scope of a possible operative cure. If the 4 operable patients who died or were lost 7 8 and in two instances to years after operation with out evidence of recurrence were reckoned as cures we would then have a 478 per cent operative salvage among the operable patients with this type of cancer.

SI INDLE CI LL CANCER

In our first communication the cancer cell characterizing this group of cancer was referred to as the fat spindle type of cancer cell. This latter designation is unwieldy and it would probably be less cumbersome to refer to this cell as the spindle type of cancer cell, and to designate this group as the spindle cell cancers.

This group forming the least common variety of the epidermoid cancers of the cervivis composed of cells which as their name implies are spindle shaped. Their nuclei assume a deep humatoxy lin stain are closely placed and separated by only a small quantity of cosin staining, exitoplasm. Nucleoli are occasionally but not commonly seen (Li_b 4)

The spindle cell group for this particular study comprises 17 patients. In Table VIII

TABLE \1-SHOWING THE RELYTION OF THE LATENT OF RADIAL INVOLVENIAL OF THE CERVAN TO THE INCIDENCE OF OPERABLE AND CURED PATILATS WITH TRANSITIONAL CELL CANCER

	O h d f 1 th k				T	Tw th d f 1th k				E thk 1 d		
D t f ymp m	N f	Ор ы	C d	P as 1	T t I	Оре Ы	C d	P H	T t 1 N I	о ы	C d	P p bl
m	8	8	5	6 s		-	1	<u> </u>		-	-	
	3			6 6			1					
3	3		1	1	6	6	1	1	7	1	1	-
_	3			6 6		3	1	66 6		3		-
5												00
6									5			00
		_										5
8				_							Lo	1
Τl		1		8		4	3	8	-,	8		37 5

toms in so far as the extent of radial cervical involvement is concerned. One is impressed at once by the high incidence of cares in the operable cases and the relatively low incidence of operable cases among those patients in whom the entire cervit was involved. It is also impossible not to be impressed with the scarcity of cures in the group in which the radial cervical involvement is limited to two thirds despite the high incidence of operability in so far as demonstrable ineradicable extension is concerned.

Type of operation performed. In this group patients were submitted to the combined vagual and abdominal punhysterectom. All but 3 died in less than 1 year after operation of the 3 exceptions one lived 4 years and the two others 2 years the duration of symptoms before operation being respectively. I month months and 6 months.

On 16 patients (17 7 per cent) a vaginal panhysterectomy was performed and 4 (25 per cent of 16) are living and well. Three of these patients were in the first month of their

TABLE VII CURED PATIENTS IN THE TRANSI
TIONAL CELL GROUP

Total mb of pale 1 tl g p (33 5°′′) 30 Operabl p 1 t (35 6°′′) 30 Operabl p 1 tsp ma tly c d (39 °′′) b (11 t h h d) (15 f h h h d) (15 f h h d) (15

symptoms while the remaining one was in the sixth month

The most common operation was the abdominal panhysterectomy which was done in 67 instances (74.4 per cent). Of these patients 14 (20.8 per cent of 67) are living and well.

The occurrence of 5 year cures in the patients operated upon by either the viginal or abdominal route is respectively 43 7 per cent of 16 and 34 3 per cent of 67 patients

Cureting of the certical mophism several days prior to radical operation was done on 30 (3,3 per cent) patients in this group. Of these 7 (333 per cent of 50) are living and well while it 1(366 per cent of 50) and be considered as belonging to the group of 5 year.

In other words of the 18 patients living and well 7 (38 8 per cent) had been curetted several days prior to the complete extirpation

Direction of symptoms. A word should be said here concerning patient number three in the group whose symptoms are of 10 months duration. In this as well as in our previous study, this case has cruised difficulty from the standpoint of proper classification as to the duration of symptoms. Her history could well have been construed in such a way as to make the duration of her symptoms much shorter. This would also seem reasonable in we r of the evident inciprency of the new lastic process as indicated by our histological

It will be noted that all patients in this group with three gland or fallon in tube in volvement also had extension of the process into the pericervical tissues. This is also true of the patient with bladder involvement. We may consider the 10 patients with pericervical extensions of the cancer as being beyond the scope of an operative cure. These 10 cases include those mentioned in the previous paragraph and also those whose symptoms are over 8 months in duration. Pherefore of the 17 patients who are now under consideration 7 (41 per cent) may be considered operable.

Circs in this group are of less frequent of currence than in any of the preceding groups only 1 patient (5.9 per cent of 17) being alive and well today. Tive year cures amount to 11.7 per cent and in this connection it is in teresting to note the extensive involvement with metastases of the patient who lived 6 years after operation before succumbing to

recurrent cancer

In any consideration of cured pritients we are necessarily concerned with the possibility of cure in those who are operable. In view of the fact that only 7 pritients in this group come within the seope of operability the one cured patient gives us an operative cure of 14 per cent in the operable cases.

ADENOCARCINOMA

Nine patients in this study had adeno carcinoma as the type of neoplasm involving the cervix. Table XV gives the salient fea tures encountered in this variety of cancer

Adenocarcinoma is the rarest type of cervical eancer but unlike the rarest form of the epidermoid variety does not possess a similar degree of malignancy. All but two of the patients in this group who died of cancer lived 2 years or more after operation one living 2 one 3 and two 4 years before succumbing to a recurrence. In brief of the 6 patients in this group who died of recurrence 4 (66 per cent) lived 2 years or more after operation

Ovarian intol ement occurred in one patient (if per cent) operated upon during the fourth month of the disease and was associated with tubil uterine and pericervical extensions

Corpus uters The neoplasm invaded the body of the uterus in two instances (22 per

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eent) In both there was associated pericervical extension of the cincer with complete involvement of the cervix and the ultimate result was fatal. In this group, therefore involvement of the corpus uteri was uniformly fatal and the outcome to be anticipated in view of the associated pericervical involve-

It is here impossible to predict the influence that extension to the corpus uteri without pericervical involvement might have on the final outcome in a given instance

Bladder until ement occurred once in this group in a patient whose symptoms were of 4 months duration. The involvement was by direct extension and the outcome fatil 3 years after operation with the employment of radium.

Percervical extension of the neoplasm oc curred in five instances (55 5 per cent) All of these patients died

Vagual extension of the cancer occurred in two thirds (6) of these patients. Where this extension was uncomplicated by radial periocrical extension of the cancer a cure was obtained in 2 out of the 3 patients (66 6 per cent of 3) so affected. It is obvious there fore that vaginal encroachment by adeno carcinoma of the cervix does not preclude an operative cure.

The study of cervical in of ement is not par ticularly relevant except to show that 2 of the are tabulated the outstanding features char acterizing the disease in this group of cancers

TABLE AIL CURED PATIFNES IN THE SPINDLE
CELL GROUP

Hiac gland metastasis were noted in two instances in both associated with extensive cervical and vaginal involvement as well as extension into the pericervical tissues. One of these patients with symptoms of 3 months duration lived 1 years after operation and the other whose symptoms were of 18 months duration lived 6 years before dying from the effects of a recurrence

Fallopian tube in of ement occurred in 2 patients in each instance the uterus and periorical tissues were also implicated. One of these patients lived 1 year after operation and was lost trace of while the other whose simptoms were of 24 months duration hied 2 years before succumbing to a recurrence.

In observed of the copbus uters occurred in 8 patients (4, per cent) of this group. One of these patients (125 per cent of 8) is hving and well white another lived over 5 years before dying of a recurrence. It is note worthy that with one exception all of the patients in this group with extension of the cancer to the corpus uters also had percervical involvement. The exception is the one and only patient in the group who is living and well. The uterine extension in her case is not associated visit perceivant extension.

In obtained of the pericer real tissues occurred in to patients (58 8 per cent). All except one died of recurrent curcer. This patient died 2 veurs after operation as the result of a cardiopathy (clinical diagnosis) there being at that time no clinical evidence of a recurrence.

I agual in of ement in the carcinomatous process occurred in 15 patients or approximately 88 per cent of this group. From this phase of the pathology little can be deduced that might serve to determine any thing of prognostic significance in the pindle cell enterts.

The extent of cerucal implement in this group is also not particularly relevant in so far as ultimate cure or postoperative lon early are concerned because no definite relation can be shown between them

The types of operation performed are readily seen at a glance and are not particularly relevant except possibly to note that of the 10 patients who had abdominal panhy sterectomes performed 40 per cent lived 2 years or more after operation while out of the 5 submitted to the taginal operation only one [20 per cent) lived as long. On only patients in this group was the combined vaginal and abdominal operation performed and one of these (in the third month of symptoms) lived 2 years before dwing of a recurrence.

Curcilage of the neoplastic proces several days prior to the radical operation for extination was performed in 5 instances and the only patient in this group now living is one on whom this procedure was carried out

Duration of symptoms: What influence the duration of the symptoms before operation everts on the ultimate outcome in spindle cell cancer is difficult to determine. The number of patients in this group is so small that any deduction would appear inhitrary. It may however be noted that after the eighth month of symptoms every patients had periceivate extension of the neoplasm. This alone as previously demonstrated in our experience precluded all hope of an operative cure and from that standpoint renders the case in operable. However a patient may live for several years in complete comfort before succimbing to recurrent cancer.

One might therefore presume that any p tent with spindle cell cancer of the cervit with a history of over 8 months duration should be considered inoperable in so far as a permanent operative cure is concerned

Operable cases The criteria for operability in the spindle cell group of cancers are probably similar to those recognized for the spinal cell group in view of the fact that uterne involvement by the carenomatous process does not altogether exclude the probability of an operative cure provided of course that uternic extension is not associated with periorrical invasion.

cancers It must be mentioned however that in the latter group the only cured patient had extersion of the cancer to the body of the uterus

Literision to the agina of the neoplism in patients who could otherwise be operated upon warrants a more unfavorable prognosis than uterine extension in the spinal cell can cers. Other factors being about equal it might be said that the prognosis for an ultimate operative cure for vaginal extension as compared to uterine eitersion is as it is to 14. This complication is most se ious in the transitional cell cancer and is least serious of all in the adenocarcinomata. No generalization is warranted for the strindle cell cancer.

Duration of symptims bifore operation. It would appear justifiable on the basis of our study to say that in the spinal and transitional cell cancers a duration of symptoms exceeding 8 months is sufficient to put the patient beyond the scope of an operative cure. In the case of the spindle cell cancers our study would indicate that this time limit is probably too liberal. For the adenocarcinomata no such stringent or arbitrary duration of symptoms can be predicated as for the eancers of the epidermoid variety.

The degree of cer ical in oltement provided there is no pericervical involvement appears to be a relatively unimportant factor in the spinal cell cancers as well as in the adeno carcinomata. In the case of the transitional cell cancers however the degree of radial cervical involvement immediately assumes an important role so that of the cured patients those having one third or less of the thickness of the cervix involved in cancer as compared with those having more extensive involvement are as 2 is to 1

In fact patients with transitional cell can cer seen during the first 8 months of their symptoms who have only one third of the thickness of the cervix involved present an operability incidence of 95 per cent and the cures obtained in this operable group are 57 8 per cent. This is in distinct contrast to an operability incidence of 15 per cent and cure incidence of 17 6 per cent in the patients having two thirds of the cervix involved or in operability incidence of 31 per cent with a operability incidence of 31 per cent with a

eure incidence of 33 3 per cent if the entire cervical thickness is involved

No generalization can be made for the spindle cell cancers

Diagnostic curettage performed see real days prior to the radical operation was done in 10 patients with spiral cell cancer and 15 per cent of these are well today. Of the transitional cell cancer patients who are hiving and well 388 per cent were curetted several days prior to operation. In the spirale cell cancer group 5 patients were curetted. This includes the only patient in this group who is well today. Curettage was performed twice in the group of adenocarcinomata and one of these patients is well at the present time.

Undoubtedly curettage for diagnosis several days prior to operation for radical extirpation does not render the prognosis hopeless

Prognosis in operable patients. In the group of epidermoid cancers the spinal cell cancer offers the most favorable prospect for operative cure. Provided our criteria of operability are accepted a cure may be anticipated in 63 6 per cent of the operable cases of spinal cell cancer who survive the operation.

The transitional cell cancer comes next offering the possibility of a cure in 39 to 47 per cent of its sufferers while the spindle cell cancers are the least hopeful of all in that only a 14 per cent cure is revealed in our study

The adenocarcinomata offer the most hope ful outlook in that 75 per cent of the operable cases may be considered cured. However we must again point out the small number of patients in this group and the danger of accepting without qualifications deductions formulated on such premises.

Minimal requirements of an adequate oper atom for carcinoma of the cervix uten are presented. It is also apparent that in this restricted group of patients operated upon 45.8 per cent were evidently beyond the hope of cure by operation.

CONCLUSION

A postoperative prognosis in carcinoma of the cervix uteri can be made provided that the tissue removed at operation is studied with sufficient care and that an adequate operation is performed by a surgeon ade I VBIT NATE—SHOWING THE LITON NOSIS THAT MAY BE TREDICTED IN PATIENTS SURFANCE OF A VIEW WHEN CONSIDERATION IS CALLY THE PREDOMINANT CELL TAPE AND THE TALEORS COVERNAL OF HER MADELIA IN CANCEL OF HIS LEVEL WITH THE CANCEL

3 cured patients had the entire cervix involved in cancer

Type of operation performed. The two prients on whom a vagural panhysterectomy was performed had extension of the cancer which made the condition incurable. The ibdominal panhysterectomy was done on the remaining seven.

Diagnostic curettige several days prior to operation was done twice in this group. One of these patients is ally and well. So one may conclud, that curettige not tollowed by immediate operation is not incompatible with an ultimate operative cure.

Duration of symptoms. It is difficult in fact obviously impossible from a study of Fable XI to formulate any rule as to a time himit based on symptoms beyond which a case of adenocateinoma of the cervix is to be considered inoperable. In this respect, it differs entirely from the others, beretotore described.

Curés Of this group 3 patients are living and well today giving an ultimate cure of 33 3 per cent. Reference to Table XV shows the duration of symptoms before operation and it is little short of mary clous to note that one patient had had outspoken symptoms for more than years. The symptoms in this in stance were a profuse malodorous viginal of charge and a vell defuned mutrorithigh attributible to no demonstrible endometral or myometrial abnormality. This patient is living 14 years after operation and 3 years ago underwent a radical breast amputation for cancer.

Other than these 3 there are no 5 year cures

in this group

Cures in operable cases. Although 33 3 per cent represents the operative cure in this group of cancers it does not indicate the out

come to be anticipated in patients who come within our conception of operability. A flance at Table XV will immediately reveal that 5 (55 5 per cent) of these patients had extensions of the cancer beyond the radia contines of the cervic thereby losing all chance of operative cure. The five cases just men tioned also include all other extensions and metastrases except those involving the varina metastrases except those involving the varina

The incidence of operable patients in this group therefore is 44.4 per cent. The incidence of operative cure in these operable cases is 75 per cent, thereby surpassing even the spinal cell cancers in the favorable prognosis that may be offered in the operable patients who survive their operation. This is an wholly unfore cen result and was alto, either unantical patients with the operable study was undertaken.

SUMMARY

This study was planned primarily to ascert run if possible the factors that influence the chances of an operative cure in a patient suffering with cancer of the cervis uten pro ided she sur nes the immediate effects of the operation. Certain fictures are here briefly indicated upon which a prognosis may possibly be based.

Extension and metastases when demonstrable in either the rectional lymph nodes the adneva bludder rectum or pericervical its use render impossible an ultimate oper tive cure

Uterine extension of the cancer without extension elsewhere evidently impairs the chances of an operative cure but by no means obviates it in spinal cell cancer. In the transitional cell type extension to the corpus uter apparently outrules any operative cure. Yo generalization on this phase is permissible in the adenocarcinomata or in the spindle cell.

REVIEW OF LITERATURE EXPERIMENTAL AND CLINICAL WITH A REPORT OF THREE HUNDRED

BY DOUGLAS P MURPHY MD I ACS PHILADELPHIA
Gy cc Hosp t Hast t & f Gy cc log R ar h U er ty (P 9)

THE Gynecean Hospital Institute of Gynecologic Research of the University of Pennsylvania is study ing the effects of irradiation upon the ovary. The chief point of interest in this investigation is the health of subsequent offsping. Extensive animal experiments are being undertaken to determine the effect of ovarian irradiation on the health of the descendants of the irradiated animals.

The subject is being studied for two reasons first year by year radium and the \text{Tay} are being used more frequently in the treatment of non malignant pelvic diseases of women second many of these treatments are given during the childbearing period in amounts insufficient to produce permanent sterility. Women so treated have subsequently borne children but because some of these children presented developmental defects this gave use to the belief that they were produced by the maternal irradiation.

The present study is undertaken in the hope of learning whether the defects de scribed are due to the maternal irradiation or to other causes. If these defects are due solely to irradiation this should be well understood in order to prevent their future occurrence

This article is intended as an introductory paper to further studies upon ovarrin irridia tion. In it the contemplated investigation is outlined, and the animal experimental and climical evidence as set forth in the current literature is reviewed.

OUTLINE OF CONTEMPLATED STUDY

On account of the importance and complexity of the problem only a single aspect of ovarian irradiation is being studied. The health of offspring born following therapeutic maternal pelvic irradiation was selected as perhaps the most important clinical phase of the problem needing investigation.

This research is both a clinical and an experimental one. The clinical portion consists of an analysis of the health conditions of children born of mothers receiving therapeutic pelvic radium or X-ray irradiation, either before or during the pregnancies concerned. The material for the present communication was secured from reports found in the current medical literature.

The second part of the clinical portion consists also of an analysis of the physical condition of children born of similarly irradinted mothers but as yet unreported. The c data are being gathered from questionnaires sent to vanous observers and clinics throughout the United States.

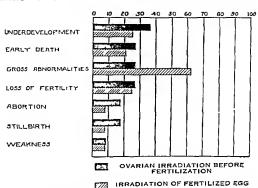
The animal experimental portion of the work consists of observations made upon the progeny of white rats. Only one generation of females is receiving ovarian irradiation prior to mating in order to permit a study of the inhentance of any possible defects induced by such treatment to be made. This investigation is being supplemented by histological observations made upon the changes observed in the ovaries of rats thus treated.

REVIEW OF LITERATURE EXPERIMENTAL AND CLINICAL

EXPERIMENTAL STUDIES

The observations of thirty seven workers have been studied in order to ascertain what experimental evidence there is at hand to indicate the part played by irradiation in the production of defective offspring in animals. For want of space the abstracts of these experimental studies have not been recorded in detail. The references to them appear in the bibliography from z-41 inclusive.

I hese observations have been made upon a variety of animals and in most instances evidence has been found indicating that the



Tig 2 Irradiation effects upon animals and their off pring. Data presented here are the same as on Figure 1 only plotted according to whether the irradiation was received before or after fertilization of the cg. Note the high frequency of gross abnormality production when the fertilized c 1 is irradiated. The small number of experiments (37) the wide variety of animals and insects employed the absence of newative findings in many of the reports and certain other factors such as the disproportion of preconception experiments (7) as a animal the larger number of postconception experiments (30) make a correct appreciation of the various findings charted here extremely difficult

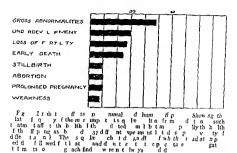
dence confirming this belief is as yet by no means abundant nor is it believed to be more than suggestive of damage. For this reason additional experimental and clinical evidence is deemed necessary before a final satisfactory answer to this problem can be given

Pre fertili ation irradiation of animals Pre fertilization ovarian irradiation bas been found to delay the onset of pregnancy in rab bits (Zaretsky 4r) but to be followed by the production of normal young Prolongation of pregnancy has also been observed to follow this form of irradiation (Driessen 10 Lacas sagne and Coutard _1) as bas likewise abor tion (Trillmich, 38 Bergonie and Tribandeau 5) Stillbirth bas been observed by Trillmich (38) Driessen (10) Lacassagne and Coutard (21) Early death of offspring has been noted by Okintschitz (30) when irradiating mice and by Sebileau (35) Driessen Lacassagne and Coutard when irradiating rabbits Under development bas also followed preconception irradiation (Driessen Lacassagne and Cou tard) and Driessen has observed general

weakness of the offspring after the treatment Gross abnormalities have been noted by Lacassagne and Coutard and in this country Bagg and his co workers have apparently demonstrated the presence of gross abnormalities in mice apparently the result of maternal irradiation. Bagg in a personal communication states that be has been un able to reproduce the original defects in a second set of similar experiments.

In addition to the gross changes seen by the above writers certain of the cytologists (Mavor 26 Muller 27) have observed striking effects in the structure of individual cells especially in the nucleus following irradiation. It has been shown that irradiation may disrupt the normal chromosome arrangement in the nucleus without altering the viability and that following such treatment atypical monsters may be produced. Hinrichs who recently reviewed the literature on irradiation effects upon living tissues says that

The chromatin is more susceptible to



young of these irradiated female animals suffered injurv because of the maternal treit ments. The chief disturbances observed in the order of their frequency are presented graphically in Figure 1 in this dirgarm loss of ferbility and prolongation of pregnancy refer to their rudiated mothers and not to the offspring. From this diagram it appears that gross "ubnormalities among the young of irradiated mothers are not infrequent and underdevelopment and early death are also important sequelce."

The observations on Figure 1 were recorded irrespective of the time with regard to fer tilization at which the irradiation took place In Figure the same data are graphically pre sented but in a different fashion. Here the black bars represent the sequelæ observed hen irradiation preceded pregnancy or fer tilization of the ovum whereas the cross hatched bars represent the effects of irradia tion administered during pregnancy or after fertilization of the ovum had taken place. In the latter case the developing embryo was directly irradiated and here there wa a de cided increase in the frequency of gross abnor mality production Figure 2 based on a small series of experiments upon a wide variety of animals and insects presents contrasts be tween preconception and post conception effects which may give erroneous impressions as a result of these facts namely the

small amount of material and the conditions under which they were carried out

In a number of the animal experiments forming the bases of Figures r and only a small series of animals was employed and in some of these experiments no controls were used. It is quite possible that if more thorough and complete observations had been made the final results would have been different.

For the purpose of making easier comparison Figures 1 and have been drawn to a scale of one hundred. These results do not however represent true percentages since in most of the reports examined negative state ments were not recorded for each of the fird mgs charted. This fact however on the not to alter our opinion concerning the great frequency of gross subnormality production as recorded in Figure 2.

The great frequency of occurrence of gross abnormalities among the young of animal irradiated when present or after fertilization of the egg as the case may be would seem to prove that the irradiation was the cuse of the disturbances observed. Most of the experiments in the senes studied were carried out upon the fertilized egg. The few remaining studied—ome six or seven in number—upon prefertile atton irradiation suggest that subsequent off pring may suffer as the result of preconception irradiation. The evi

1 Irradiation of the de-cloping embryo is extremely likely to injure its health and future development

2 Pre fertilization ovarian irradiation of animals may injure the health of subsequent

offspring

3 Additional confirmatory experimental evidence would be of great value in determin ing what effect preconception or pre fertilization irradiation really has upon the health and

development of future offspring

4 The health and development of all children born of mothers who have received pelvic irradiation during or prior to the pregnancies concerned should be studied errefully in order to ascertain whether such maternal irradiation has had any harmful results upon the health of the children

OBSERVATIONS ON HUMAN BEINGS

A study of the current literature has been made in order to gather as much information as possible concerning the health of all chil dren whose mothers received pelvie radium treatment or \ ray irradiation during or be fore pregnancy Approximately 3 o such pregnancies bave been reported Tew ob servers have published more than one or possibly two personal observations on cases associated with irradiation given during or preceding pregnancy Where other authors cases bave been quoted original sources have whenever possible been examined and an attempt has been made to secure all available data bearing upon the health of children born of irradiated mothers following such treat ment regardless of the time that had elapsed between the treatment and the conception In a few instances there were twin births In eleven cases second children were born follow ing one radium treatment or X ray pelvice therapeutic irradiation and of these eleven women four conceived the third time

The large number of pregnancies recorded in this investigation are explained by the fact that a group of forty nine pregnancies were reported by Pinard (129) with practically no details of the treatment. It is quite possible that if such details hid been included many of these pregnancies might have been omitted as unsuitable for this study, and the grand total

have been thereby reduced. There were 113 reports examined. The first report was made in 1906 and from that time until 19 o relatively few cases were recorded. In 1920 there was a decided increase in the number of observations and since then the number of investigations recorded each year has been furth constant.

I ack of space prevents the publication of the abstracts of the case reports from which our material was drawn The references (4 -156) in the bibliography however give the sources from which this material was secured To the best of our knowledge at includes all reports of pregnancies associated with irradiation in which details bearing upon the health of the children or of the fetuses con eerned were found Therapeutic abortions performed by means of \ ray arradiation in which no description of the development or health of the fetus was included were omitted from this consideration. It was believed that such eases would be of no value in this study since the health or development of the child thus born was the chief point of interest On the other band cases in which accidental abortions occurred although no mention was made of the health of the fetus, were included in order that we might learn the effect of

The ages of the women receiving irradia toom were mentioned 122 times. The youngest woman treated wis 18 and the oldest was 46 years of age. Figure 3 is a polygonal curve indicating the number of treatments given arranged according to the ages of the women treated. According to Noris (121) the peak of the curve between the ages of 27 and 34 represents the period of greatest fertility.

irradiation upon the abortion rate

Meager data bearing upon the health of children born prior to irradiation treatments were found but in a large number of cases mention was made of the frequency of abortion. For this reason a study of the health of children born prior to irradiation has necessarily been omitted whereas a study of the abortion rates as influenced by irradiation has been made possible.

Abortion rate in general population Since registration of pregnancies and abortions is not required in most communities it is diffi



The dividing cell is more susceptible than the resting cell

- Embryonic rapidly differentiating tis sues are more susceptible than adult tissue 4 Weak dosage may accelerate whereas
- strong dosage delays cell activity
- The more intense the irradiation and the earlier it is applied the more marked are the defects
- 6 The effect is more pronounced in sys tems where development is most precocious such as the nervous system and the vascular system
- Discussion of experimental data. All the experimental data indicate that irradiation of the de cloping animal embryo is a procedure that is extremely prejudicial to the future health of that individual. This evidence is convincing both in its quantity and in its quality

Such a statement cannot be made a ithout reservation as regards the question of pre conception or pre fertili ation irradiation in animals Nevertheless the available evidence in favor of such damage being possible is highly suggestive

- The facts in support of this suggestion are That evidence has been presented by various observers
- 2 That this evidence has been confirmed. by experiments upon different Linds of animals
- That other agents such as alcohol etc (ee Stockard) when parents are subjected to their influence in sufficiently large amounts are known to mure the health of offspring

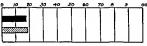
That more than one higlomet has been able to observe cellular changes affecting the hereditary mechanism namely the chromosome arrangement of the nuclei follows. irradiation and later has been able to con firm this by the appearance of atypical off SDring

Such evidence as that just cited would indicate that pre fertili ation irradiation in the case of human beines might act injuriously upon the health of children born following such maternal treatments. Arrayed against the fact that preconception irradiation may injure the health of children born subsequent to maternal irradiation are the followin facts based upon the experimental evidence just reviewed

- 1 Very few experiments have been per formed and some of these have not been well controlled
- 2 Injury of offspring has not always fol lowed maternal irradiation in control experi ments

Furthermore it is quite possible that the human ovary and the animal ovary may not respond alike to irradiation. The human ovum may be so sensitive to irradiation that dosages large enough to bring about the de sired therapeutic results will in all cases kill the more mature ova whereas the primordial follicles may be so resistant as to withstand completely any injury that may result from such substerdizing irradiation dosage

From our review of the experimental evi dence adduced we have drawn the following conclusions



ABORTIONS PRIOR TO IRRADIATION

hig 5 Abortion rate as affected by irradiation Show ing the relative abortion rates in 256 pregnancies occurring in 61 women before irradiation and the same kind of a study in these women after pelvic irradiation where 73 pregnancies occurred

uten Other indications included various pel vic disturbances and some discusses of a more general nature such as cardiac complaints leukamia psychoses and the like where fu ture childbearing was deemed inadvisable. In these cases the pregnancy occurred in spite of the irradiation given to induce permanent stenlity.

Sources of radiant energy. In this series of pregnancies subjected to pelvic irradiation the X-ray seemed to be the method most often applied having been definitely mentioned as being the agent employed in 108 cases where as radium was used in 64 cases in one or two instances a combination of both agents was employed.

Irradiation dosage The exact dosages of X ray and radium as applied in this series of 320 pregnancies were not recorded. This was due to a variety of reasons. In the first place in quite a number of instances no definite mention was made as to whether either radi um or the X ray was employed the word irradiation alone being used. However it may be assumed that the \ ray was used in most of these cases In another large series of cases no mention was made of the dosage em ployed In still other reports all details were not recorded and when the treatment was described the technique employed seemed to vary so much in the different cases that it was impossible to secure uniform data for analytic purposes For these reasons no systematic attempt was made to collect information con cerning the dosage The chief criterion as to dosage in selecting these cases for study was first that a therapeutic dosage had been used in distinction to a diagnostic dosage as in the case of \ ray that it had been applied in such



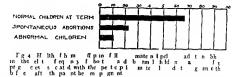
Fig 6 Mortion rates in first second and third pregnancies following single maternal pelvic irradiation exposures. Showin the abortion frequency in eleven women following maternal irradiation. All had second pregnancies while four had third pre, nancies. Note the uniformity of the rate in the first two pre-nancies of theseelven women.

a manner that in all probability the ovaries received a large share of the irradiation and that pregnancy was known to exist at the time of treatment or to have followed at a later date

Effects of irradiation upon human affspring In considering the effects of irradiation upon offspring the bearing that such treatment may have upon the abortion rate has preai ously been discussed and we have seen that it apparently has little if any effect in in creasing or decreasing this rate. From the practical point of view the most important question for elucidation is whether maternal irradiation does injure the health of offspring who reach the period of viability are born at or near term and possess such viability as to become personalities in the true sense of the word

Tigure 4 shows that irrespective of the time at which the irradiation is given as regards the onset of pregnancy approximately two thirds of the pregnancies and subsequent children are normal in every respect. Some 22 or 3 per cent of the total number of pregnancies ended in abortion and in the final 11 per cent the offspring when born at or near term appeared to be defective in some respect

In selecting the individuals to be included in this last II per cent all children who were born at or close to term were considered also those who presented even slight defects, or serious defects or who manifested some evidence before the last observation was made that their health was not perfect also those who died early in life. The duration of time after birth that these children were observed varied greatly. In some only the condition at birth was recorded whereas in others observations were made as long as 7 years after birth. All children showing any disturbance



cult to determine the true abortion rate for the general population Through the kindness of Dr I B De I ee however Table 1 is pre sented which indicates the frequency of abortion in the cities cited

Abortion rate in women recei ing irradiation From Figure 4 it will be seen that the fre quency of spontaneous abortions recorded here is about 2 per cent. This applies to the 320 pregnancies observed regardless of the time of irradiation treatment as respects the onset of conception This rate appears to be even lower than the normal rate as may be observed from Table I

TIBLE I -- IBORTION RATE FOR GENERAL POPULATION IN GERMAN CITIES CITED BELOW

A b	D t	Pla	Abo p
Latzk	899	i.	. 8 9
L tzk	9 4	,	32
l tzk	9 3	n a	57
Bumm	9 7	Bln	0.4
H s h M		Bl	3
Schottel u	10 9	H mb rg	5
Ja chk	19		_5_
		A ac	11.3

TABLE II -- ABORTION FREQUENCY IN MULTIP ARÆ AS INFLUENCED BY IRRADIATION

N mb I ad ted mult pa a 56 Pegn ces nths om po to irrad tio (18^{C7}) 47 Abort us thep gna c P gn c th wom n fte (10^{Cr}) 73 lb tos th bseq tp gna e ec dd I the think bo pet the thet many becoming t

Abortion rate in domen before and after irr 1 diation Data are presented in Table II show ing the frequency of abortion in irradiated women as it occurred both before and after the irradiation treatment. This material is

presented graphically in Figure 5 These per centuges of 18 and 10 indicate that the irra diation has had very little effect upon the abortion rate and in spite of the fact that the patients so treated were in most instances suffering from disturbances of the generative organs which might be regarded as favorable to a high abortion rate

Abortion rate in first second and third preg nancies following irradiation Eleven women after arradiation had second children and of these four had third children. It is intere t ing to note that in this group all the children born at term were perfectly normal. The abortion rate for the first eleven pregnancies in this series appeared to be identical with the rate for the second eleven pregnancies there being four abortions in each group of eleven pregnancies. In the third pregnancies there were two abortions and two full term healthy children This abortion rate is graphically presented in Figure 6

Abortion as influenced by the time of the arradiation with regard to the date of fertili a tion lift; three nomen were irradiated at some period during pregnancy and nine aborted (16 9) whereas 265 women were irradiated before the beginning of pre-nancy with 67 abortions or a rate of approximately

6 per cent The e percentages are shown

graphically in Figure 7

Indications for irradiation The indication for treatment was mentioned 177 times In approximately 70 per cent of the women in this senes of 177 cases pelvic disease was the indication for the treatment. The most im portant symptom was uterine hæmorrhage usually the result of ovarian dysfunction The second most important indication for irradiation was myoma uteri and the third most frequent was carcinoma of the cervix

12 Bailey and Bagg in 1923 (47) also reported a death in 11 hours The child showed malformation of the head with sagittal suture open (\ ray)

13 II Little in 1023 (104) reported a microcephaly

(Radium) 14 G Petenyi in 10 3 (126) reported a microcephaly (\ ray)

15 Schiffer in 1923 (126) reported a microcephaly (\ 1ay)

16 Vignes and Cornil in 1923 (148) reported a case of acerebri A utenne sound had been passed 4 months before

17 H Abels in 1924 (42) reported a microcephaly (\(\arg ray\)
18 LeLouer and Delapachier in 1924 (102) reported a

19 H \aujoks in 19 4 (119) reported a microcephaly

20 N Schilling in 1924 (138) reported a death in 3 hours after casarean operation for rigid cervix (Radium) 21 A Schwaab in 1924 (137) reported a microcephaly (\ 1ay)

22 Ganzoni and Widmer in 1925 (81) reported a microcephaly (\ ray)

Moeller in 1925 (114) reported a case of hydro

cephalus and mon olism (Radium)
25 J Zappert in 1925 (155) reported a weak mon goloid imbecile with hypophalangia (\ ray) 26 E Deutsch in 1920 (64) reported a microcephaly

Werner in 1926 (151) reported a microcephaly

(\ iay) Of the 53 women irradiated during preg nancy 9 (16 9 per cent) had unhealthy chil dren at or near term or who died shortly after birth In a few instances the disturbances of health noted might have been attributed to agents other than the previous maternal irradiation In deCourmelles case the death might easily have been due to the familial lues Botarro's child apparently died because of prematurity and lack of care The bald spot on the head of the child described by Berkeley was only an insignificant defect although in all probability it was due to the intracervical radium application The small size of the child described by Zweifel might have borne no relationship to the maternal irradiation The child reported by Bailey and Bagg dying at 21/2 months and whose mother had suffered from eclampsia might also be eliminated from serious consideration Loner's case presenting a slight nystagmus on the second day after birth could also be omitted from discussion here Shilling's in fant death following a cresarean operation for rigid cervix is also a doubtful case and may

Absenc f b tract by m m ti t m i d t t my f llowed by be omitted from our list. If these children are eliminated from our consideration, there still remains a large series of serious develop mental defects to explain and this selected group including 14 microcephalic children would seem to indicate that the maternal irradiation must have been the exciting agent in their production. From this r sume it may safely be stated that arradiation of pregnant women when the pelvic organs are in the field of exposure is an extremely dangerous pro cedure affecting as it does the health of the child in utero

Health of children born following precon ception pelic irradiation. In this group to begin with we find a relatively small number of children born at or near term in whom there is any marked degree of impairment of health or any developmental defects Nevertheless one cannot say definitely that this group is perfectly normal nor that the defects present are of only a mild nature A brief list of the chief defects observed follows

1 R koehler in 1918 (95) reported a death in 2 days from pneumonia (\ ray)

2 \(\Gamma\) Hermann in 19 o (87) reported the case of a pale but organically normal child of good intelligence but who did not talk much. The child walked at 17 months Author believed the trouble to be due to prematurity and the lateness in life at which this pregnancy occurred (\ ray)

3 O Pankow in 1920 (125) reported the case of a child weak at birth and pale who could not sit at 9 months and who later had rickets and otitis media (\ ray)

4 L J Stacy in 1920 (143) reported the case of a pre mature child deformed but no description of the de

formity was given (Radium)

5 A Peralta Ramos in 19 4 (1 8) reported the case of a child who was small whose skin was dry wrinkled and icterie who had two ossif cation defects in the left parietal hone and one in the right parietal bone. Erythrodermia appeared a few days after birth Treatment was given only s month before conception took place (\ ray)

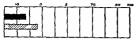
6 F A Pemberton in 19 4 (1 7) reported the death in 2 days of a 7/ months fetus Mother had eclampsia (Radium)

7 H Behrendtin 925 (5) reported the case of a slightly underweight but normally developed child Mother had

heart trouble and severe anæmia (\ ray) 8 Gummert in 1925 (82) reported a microcephaly Treatment of mother was given several years prior to birth

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10 D P Murphy in 1927 (117) reported the death of a well formed child following a three day labor and casarean section Case irradiated by author but delivered by anoth er physician. (Radium)



RRADIAT ON DURING PREGNANCY

whater were included in this group in order that the reader might appreciate the nature and the seriousness of the abnormalities recorded even though these disturbances of health might not have had even a suspisous connection with the previous maternal treatment.

In the case of the animal experiments preously recorded it was apparent that the frequency of birth of defects e offspring was far greater in the group where the fertili ed egg was irradiated than when the irradiation preceded fertili attom or conception.

In analyzing the frequency of defect e his man offspring according to this same time factor the end results have been summarized in Tables III and IV and are graphically presented in Figure 8 It will be seen at once that in the human irradiation during pregnancy gives a light frequency of damaged offspring whereas pre pregnancy irradiation gives an extremely low percentage of damaged off spring

TABLE III —HE ALTH OF CHILDREN FOLLOWING MATERNAL IRR ADIATION DUPING PREGNANCY

N mb at sm pe d W men e g d t du gp g 53 ٠, th Ab et (∞°') 44 Filt mp g t p rfectly n m l Fil t m child (6 °) 7 ry spect

TABLE IV —HEALTH OF CHILDREN FOLLOWING MATERNAL PRECONCEPTION IRRADIATION

A mbe

I d t g b f n t f pr gn cy 67

Abo t th f ca 67

Full trm p g this grop (100"") 18

Ab malchid b n t term (1)



IRRADIATION DURING PREGN NCY

Fg 8 Chld halth as influenced by the time of the m te al i dat n Sh wing the rel t effice you did tuba at h lith de loop intofchilde bin trim fm this receing plic thape to adum yirdat eth r h nor join atorat sm tim by the beging plip a cy

The question then arises as to whether in either or in both of these groups the offspin are damaged as the result of maternal irradia tion or whether the defect is caused by some other agent. A more detailed study of the defects observed will help to clear up the epoints.

Nature of dawage in children born of mothers irradiated during pregnants. In the 20 pre nancies associated with pelvic irradiation treatment 53 developing embryos were irradiated while in utero. Of the children born in this group 7 were abnormal at birth. The majority presented serious developments of the children's The following is a list of the chief pathological findings to, ether with the names of the nuthors quoted.

d C m ll 93(7) potdth se fa m ll hid dt be draeght whehded f h fte b th F mb h story of he (X y) Ash nb m n 9 (4) ep ted the ne i m coceph ic hid (X ny) ad Beg 1 19 (54) pot dade th lown g = op at Th hld va d wasn tp op lyttener of du gfit f llown g æ ho n mat cht ft b th (Rdm) 4 Alb cht (43) q t d by Flat u (19) p it d ph by (Lray)
B L l y () q ted by L wso (o) rep rted bid pt hidshed lilow g t crv l dim tatm t th p tlat d pp a ed (R dim) 6 Fl ta n 9 (7) p t d microc ph ly (\ ray) 7 Stitte 1 92 (44) ep tdamcocph ly 8 E Zw 11 92 (56) rp tdth f sm II wilde I ped child (\ ray) 9 Apt d km rg t 923 (44) m ph h (\ v)
o Bly dB g 93 (47) prt d d th
days Th hidh dap ab fid dd uble i b d d uble 1 b feet BlyndBgg 93(47) potd dathfm mat m th Car n ti wa m

pl tdby clmp (Rad m)

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In studying this group of ro children born of mothers who received their irradiation prior to the beginning of pregnancy (there being

65 women in this group) it is evident that in a number of instances the disturbances might with justice be attributed to causes other than the preconception irradiation. In this group there seemed to be no uniformity of defect as was observed in the group in which irradiation was administered during pregnance.

Of the 10 cases listed in this preconception group 6 could be attributed to other possible causes such as the following Case prema turity and the lateness in life of the preg nancy Case 5 child possible syphilitic (au thors view) Case 6 maternal celampsia Ca e 7 severe maternal anamia and cardiac disease Case 0 mother believed to be almost an idiot Defects in children born of these mothers are more frequent than in those of normal individuals Case to death due en tirely to difficulties of borth (author) cases

If these 6 cases can be considered as presenting disturbances or death due to factors other than the preconception maternal pelvac itradiation only 4 children in some 265 births may be regarded as having possibly received any injury as the result of the previous maternal irradiation. The e four children presented Case x death on the second day after birth. Case 3 general weakness and a tendency toward disease. Case 4 a de formity the nature of which was not dis closed. Case 8 a. in apparently true case of microcephaly.

GENERAL DISCUSSION

From the evidence at hand it does not seem necessary to discuss the question as to whether irradiation of the pregnant woman injures the health of the child when such treatment is administered while the fetus is in interest that sadministered while the fetus is in interest. That damage results is fully confirmed by the great bulk of experimental work upon this subject. This indicates that serious developmental disturbances are likely to result from such treatment in human beings at least when the exposures are given in what are commonly accepted as therapeutic dosages.

Concerning the effect upon the health of future children of irradiction when applied to the ovarian region before pregnancy has taken place no definite answer can be given The animal evperimental work indicates that damage to subsequent children is likely to result. This evidence is not yet however considered to be sufficient upon which to ba e a inial satisfactory conclusion. A full discussion of clinical observations made upon women who hive received such irradiction is necessary in order to help clarify this problem necessary in order to help clarify this problem.

The number of preconception radium and ray treatments (65 approximately) recorded in the literature, with their associated births at or close to term including only to cases in which the children born at that time were not normal do not pre ent any very striking indication that the previous maternal irradiation had any definite or serious effect upon the health of the children born following.

such treatments

The frequency of neo natal morbidity and mortality in the population at large is difficult to estimate and especially so in the maternity or pechatine wards of hospitals since the statistics gleaned from these institutions are influenced abnormally by the great selectivity

necessarily practiced

The wide variety of disturbances observed in the 10 children born of mothers (265) irradiated in the pelvic region prior to con ception and the relatively small number of these children are both opposed to the belief that the irradiation was the cruse of the dis Furthermore these 265 women turbances constituted a very highly elected group selected in most instances because of their pelvic disease. As we do not know just what relationship might exist between pelvic dis eases and the health of children born of these mothers and as it is practically impossible to secure a suitable control group of women who has e had pelvic disease and children without any irradiation treatment it is impossible to state definitely just what relationship there may be between irradiation treatments and the health of these children in view of the existence of the maternal pelvic di ease

Furthermore we have practically no knowl edge concerning the heredity of these children to say nothing of the possibilities of syphilis alcoholism tuberculosis etc. and the effect they may exert through the parental blood stream.

There is one case in this group of children that presents gross abnormality following preconception maternal irradiation this sug gests that the irradiation might possibly have had some influence in bringing about the de fect and that is the microcephalic child de scribed by Gummert This child presents the ingle connecting link with the group of chil dren who received irradiation in utero. It ap pears to be the only abnormality that suggests any relationship between maternal irradiation and injury to the health of subsequent off spring in cases in which the treatment pre ceded the onset of the pregnancy concerned According to Gummert this pregnancy took place some 21/ years after the maternal irra diation It would seem extremely unlikely that an ovum would be partially damaged live for 1/2 years and become fertilized As a possibility however it cannot be denied. If we study the frequency of microcephaly in the population as a whole we have an additional reason for believing that this case was prob ably not caused by the preceding maternal irradiation According to Storrs of the Letch worth Village Colony for Feeble minded Cbil dren in New York State the frequency of microcephaly in the population at large is probably not more than one in ten thousand or more births If we go still farther it would seem that one case in 265 births would be a somewhat high rate of frequency of micro cephaly and that it would be quite possible in this case for the irradiation to have been the cause of the disturbance Considered theo retically as regards the frequency of micro cephaly in this group we might assume that if we had been able to study a group of some 20 000 irradiated women we might not have found another similar case

Without going into further detail concerning the frequency and nature of the disturb ances observed in the children born at or close to term following maternal preconception pelvic irradiation we feel reasonably sure from the evidence at hand that the preconception irradiation was not the cause of the

disturbances cited but we cannot make this statement with absolute certainty

GENERAL SUMMARY

- I The literature bearing upon ovarian irradiation as it may affect the health of subsequent offspring both animal and hu man has been carefully reviewed
- 2 Trequent serious developmental disturbances have been observed in animal and human offspring when the pregrant animal or human or the fertilized egg has been directly arradiated. These disturbances are severe in nature and in human beings present themselves most frequently in the form of arrested cerebral development characterized by the condition known as microcephaly.
- 3 Abnormalities of development and structure have been observed in the young of minds that were irradiated prior to conception or fertilization
- 4 Children born of women who have been irradiated in the pelvic region prior to con ception also present abnormalities of development and disturbances of health early death and other abnormal conditions
- 5 These abnormal conditions are not es pecially frequent nor are they uniform in character

CONCLUSIONS

- I Irradiation of pregnant animals or human beings is a procedure extremely danger ous to the health of the offspring concerned (61 3 per cent defective) and in the case of human beings ought not be undertaken unless such existing pregnancies are to be terminated artificially prior to the period of viability of the child
- 2 As yet it cannot definitely be stated that preconception maternal pelvic radium or X ray irradiation is or is not prejudicial to the health of subsequent children

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WHAT EVERY DOCTOR SHOULD KNOW ABOUT CANCER OF THE STOMACH AND WHAT A GASTRO-INTESTINAL STUDY MEANS

BY JOSEPH COLT BLOODGOOD M D FACS BALTIMORE MARYLAND

In 1915 I made a complete survey of all the records of the so called stomach cases recorded in the medical and sur gical departments of the Johns Hopkins Hos pital and of the many other records of resected specimens which had been sent to the surgical pathological laboratory by my colleagues.

Even before the advent of the \ ray there seems to have been no difficulty in diagnosing cancer of the stomach. The medical service under Doctors Osler Thaver and McRae never failed to refer to Dr Halsted's service all the organic lesions of the stomach first admitted to the medical clinic Practically every patient with cancer of the stomach admitted to the mudical chinic either died while on the surgical service or was discharged from that service. Even more important when we wrote to the patients with stomach complaints who had been on the medical service only and in whose case in each instance a diagnosis of non malignant lesion had been made we were unable to find that cancer of the stomach had later been found

Of the cases of cancer of the stomach studied up to 1915 representing the first 26 years of the Johns Hopkins Hospital 75 per cent were moperable and among the 25 per cent in which the cancer could be completely re sected there was among the Johns Hopkins group one 5 year cure In this case the stomach was resected by Doctor Miller who was then resident surgeon. The patient lived a years and died in the Johns Hopkins Hos nital of cancer of the cervix. An autopsy proved that there was no recurrence of cancer in the region of the stomach and the cervical cancer was not metastatic From all sources in 1013 there were but three 5 year cures In the second cured case I resected the stomach at St Agnes Hospital in 1908 This patient lived until 1026 18 years and died of other causes The late Doctor Hertwig of Buffalo New York sent me the resected

specimen of a cancer of the stomach from a patient who lived 8 years after operation and then died of malignant disease of the kidney. These three cases of cancer of the pylonic end of the stomach answered Aocher's rule which was cures could be accomplished and in his experience accomplished only in freely move able tumors of the pylorus which produced obstruction early

When we read and carded the histories of cancer of the stomach in 1915 we could easily see from the written records that all of these patients had suffered from indigestion and had been sufficiently ill to demand an eramination long before they did so—in some instances the patient being ill on an average

of more than a year This study has shown the remarkable con trast between the education of the doctor with his great skill and precise instruments on the one hand and the lack of education of the people on the other. It was quite ap parent that the failure to educate the people had rendered all the wonderful education of the medical profession and surgical skill illusors We had an esthesia Surgical tech mique had been developed far beyond the dream of Pasteur Billroth had concerned and executed his resection of the stomach and the anastomosis known as Billroth I-duodeno gastrostomy end to end-Billroth II-closure of the resected ends of duodenum and stom ach and a gastro enterostomy of some type During this period 1890 to 1915 the mortality of resection for cancer of the stomach was relatively small throughout the world The failure to cure cancer of the stomach could be explained only by the ignorance of the adult laumen their failure to realize the possible danger of indigestion

I restuded the material again in 19 6 and wrote the chapter on Cancer of the Stom ach for the system of surgery which is edited by my colleague Dr Dean Lewis Twelve years had passed Diagnosis by the



Fig 1 Case 1 Pathol No 38634 The filling defect to minutes after be muth by mouth

Yrays had improved tremendously. The mortality of resection had been reduced to a minimum. In spite of all this cancer of the stomach is admitted to the surgical clinics of the world with an inoperability of more than



Fig 3 Case r Pathol No 38634 Photo raph of the surface of the polyp id tumor with the resected zone of normal stomach wall For filling defect see Figures r and 2



11" Case 1 I athol No 38634 The fil no defect 1 hour after bismuth 13 mouth Compare with Figure 1

so per cent and when resection is possible with a curability of less than 35 per cent. It is quite true that every surgeon is resecting cancer of the stomach in its earlier stages and every now and then he resects a being tumor of the type that precedes cancer but these are the exceptions not the rule. The rule is still inoperability in far too many cases for when the patients are examined with the λ rays and referred to surgery the condition has passed beyond the beingn stage.



Fig 4 Cae r Pathol \ o 38034 Gross sect on through tumor shown in Fi ure 3 \ ote the normal pertineum muscular coats and subnuco a The tumor is like a benua wart simply a hypertrophy of the mucous membrane.



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I very member of the medical profession should know that cancer of the stomuch especially on the puloric half belong to the curable type of cancer and its omplete removal is not a dangerous operative procedure but doctors of medicine must also know that the News both in fluoroscope and film are the only instruments of precision that will make the diagnosis possible—and diagnosis accurate—of all organic lesions of the stomach vall.

What we have to do is to teach the public to seek examination the moment they are warred of indigestion and to teach the doctor that it is really more important to study the stomach with the X-ray than the heart with the stethe cope

I have ver, carefully investigated the cases which I have tudied personally cases which presented lesions within the abdomen with symptoms sufficient to justify a study of the stomach with the fluoroscope and film and I have been unable to find a single case in which we have overlooked a cancer of the stomach. If an ulcer or cancer in the wall of the stomach or a papilloma or any type of



The Lithin 198 Theili dect

benigh tumor of the will of the stomach a pre ent it will produce a filling defect which is easily recognized in the fluoroscope and rectured in the film and this filling, defect on the pylone side of the stomach to the left of the pylone is a positive indication for emploration.

Inoperable cancer of the stomach. My expenence also teaches me that it is dan, erout to conclude through X-ray examination only that any lesson of the stomach is curier and inoperable. The positive signs of hopeless cancer of the stomach are peritoneal evidate shin modules in the abdominal wall or en larged module of the liver.

Again and again when the \ ray exam ination has indicated inoperability. I have been able to resect the cancerous mas

Explorators laparotoms. One can explore the stormach under local annesthusia by an in cision in the mid line below the ensiform and it is my opinion that this should be done in all case except when the malignant die case it climitally hopels a Secondary anemia



Fi Case 2 Path 1 to 398 2 Thoto raph t p nt next surface of sleeve receted p rtion of the middle third of the stomach. The cancer about to perforate 1 cen at \(\)

should not be a contra indication because we may institute blood transfusion

What is a complete gastro intestinal study? First an \ ray examination of the abdomen to look for stones in the gall bladder kidney and ureter I always combine this with an I ray examination of the chest I hen the patient can be given bismuth for an immediate fluoroscopic examination and a series of stomach films may be taken. The next day it is possible to examine the stomach a second time through the fluoroscope and films and to study the colon from the bismuth given the day before In every instance when the findings from examination of the stomach and colon are negative and there are no indica tions to open the abdomen an \ ray study with a dye should be made of the gail bladder If one finds a distinct filling defect in the stomach or colon the gall bladder evamination may be omitted



in, \ se Intlo No 3082 That raph of th fun, at timer of the inner side shot into, the amount f tomach all resected. The narr er porti n lon itudinal f the tomach all shots a smaller n r_nin funn old stomach due to contraction from the formalin. Compare the surface of the maliprant fun, us in Figure 8 with the ben n polyp at tumor in ligure 3

If any intestinal symptom is present below the zone of the stomich or the stools show signs suggestive of disease of the colon procto scopic cymination should never be neglected and if such examination is negative an X ray should be made after the colon is filled with a bismuth enema

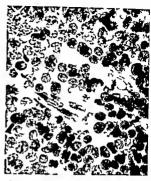
The proctoscope will not fail to reveal any lesion in the rectum as far as it is possible to see with it. An \[abla ray film made after a bismuth enema has been given will fail but on rare occasions to picture the filling defect of an organic lesion of the colon lesions of the duodenum and stomach are always pictured. If the filling defect or irregularity of the bulb is on the duodenal side of the pylorus we know that the defect is not cancer.



Γ₅ ο C P th 1 \ 398 Ph 1 m graph

The first thing to do is to get correct in formation to the public and this is a difficult task. It is quite true that thousands of people today are coming under the observation of the medical profe son for \(\naggregar{c}\) ray study but with few exceptions such patients have suffered for months and years with chronic di ease. If their trouble is cancer it is too late. When \(\naggregar{c}\) cancer of the stomach or colon has produced acute obstruction the patient has the best chance because he is forced to go to the hospital. But acute obstruction is rarely an early occurrence in these cases.

I have purposely omitted reference to the examination of gastine contents of faces to the use of the duodenal tube and to other laboratory examination. Of course they are part of a complete gastro intestinal study. In this short note I am anxious to imprese even doctor that it is the 'x-w-the fluoroscope and film—which is the instrument of precision for the accurate and early detection of organic le ions of the wall of the stomach duodenum and colon and that the 'x-ray picture made after the administration of the dye is now the most accurate method of telling whether or not the gall bladder empties itself.



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An article entitled The Survey of Stomach Carcinoma was published in the Journal of the Intervent Medical Association June 19 1915. The total number of cases reported was 18, The inoperability up to 1910 was 19 per cent the inoperability in the next 3 pears to 1915 had decreased from 81 to 62 per cent. Quite recently Dr. William Mayo grung the figures for his clinic for 19 7 records inoperability of 50 per cent.

These figures justify the educational efforts of the American Society for the Control of Cancer and in this priper it is my desire to bring the facts before the medical profession and to emphasize the importance of an immediate X ray study of the stomach no matter how slight the symptoms of indigestion are

ILLUSTRATIVE CASES

Case F gures 1 to 5 p cture th filling defect in the \ ray the g ss appearance of the beng polypus and the m crose p c sect on sho ing 2 bengn adenoma

lu p



Fig 11 Case 3 Pathol No 9159 Roentgenggrum showing fillin, defect 15 minutes after bismuth by mouth Dia,nosed inoperable by most of the examining group te epicator; incision easily operable tumor was found Resection Billroth I The patient 15 well February 9 8 10 months For gross appearance see Figures 12 and 3

Clinical note The clinical history the laborators examinations and the Nray study suggested a malignant tumor in the wall of the middle third of the stomach at the greater curvature vet at the operation a benign polypus was found and removed

The patient claimed that his indigestion had been really bad for a months. I am convinced that a months ago the symptoms justified an examination. He can still eat a big meal only to be followed by discomfort. Palpation of the abdomen fails to disclose a mass but there is some muscle rigidity in the upper abdomen which prevents deep palpation a condition not infrequent in gastric and pancreatic fessions. The stomach contents show absence of hydrochloric acid low acidity. (9) the presence of lactic acid pus cells blood cells (red) and breill Examination also showed moderate secondary anamia no blood in the stools. This gastric analysis without residium suggested cancer.

On questioning the patient again and again he admits that he has had some light indigestion for one year since 59 years of age but he explained this the presence of recurrent root abscesses. With the intense discomfort after eating for 3 months there has been no vomiting and he has lost only 5 pounds in weight.

At the operation which was performed largely under local anesthesia with light nitrous ovide and gas ether we could see nothing wrong in the stom ach which was of good size but on palpation in the middle third at the greater curvature we could feel at timor the size of a hen segg with a pedicle about one, third of the diameter of the tumor.

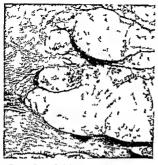
The stomach was immediately opened and by sight and touch no signs of malignant infiltration

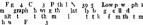


I'm 1 Case 3 I athol No 30 50 I hoto raph fgros resected specimen For Nay see I, use 11 The fungous tumor is easily seen throw h the gastine end at the raph to the picture. There is no perfortation of the pertoneal coat by tumor tissue and there were no adhesions for fon_atudinal section ee Figure 13.



Fig. 13 Case 3 Pathol No 30150 Photograph of 1 ngitudinal sertion of resecte 1 stomach shown in Ligure 2 Note that the v s no perforat on of perito cum only slight infiltration of the muscular coat. For microscop c picture see Fig. 112 14

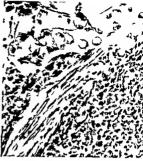




nered soo red at the base. A tedge shaped piece of the stomach vall both a tor and p st no a st r a cted. The tumor projected from the postenor wall and the def. that satured end to end. A frozen sectin is similar to that it. Figu. 5 dem strict that we were dealing with a being tumor and a study of the stomach wall around the pedicle dimonstrated that e.e. if the tumor h d been maling mant thad being en suit in this great section. There was second minute p lipoid tumor. In the most of whould if due the muscular and pentioneal cost.

The patient as not shocked by the operation and h d no d scomforts r complicate s f ny k nd On the tenth lay ho e er he sudd h de el p l signs of embolic pneumonia vithout add m alsymptoms and th n a lew hours g softemb l m to the bra thrap d death. In autops; was of allowed

The most interesting point in Case was that the tumor (Fig 6) was just as operable as that in Case 1. Yet we knew at once in the frozen section in Case 1 that the tumor was either a beingin idenoma or a possible adenocircinomi of a low grade miliginant while from the frozen section in Case we knew that we were dealing with a high grade maliginancy, which up to the present time had not been cured by resection or any other means. When we compare Figures 5 and in with the microscopic sections of the three



Fg C 3 Pthl N 30 C !! d h hp w ph t m C ph f m h w F

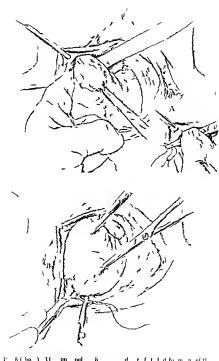
cured cases of cancer of the stomach which I reported in 1015 we will see a close resem blance with the picture in Figure 3—gros type adenocarcinoma cells of low grade of main nancy. My studies of the grading of cancer of the stomach in which the patients have hived 5 years or longer after re ection are not yet complete but in not a sin-fle cale do we find cells of the morphology shown in Figure 10.

Case 2 Patte t as 68 cars f ag Definite gratters sumptoms were obser it in March but be dd of me under the ob into 6 phy train bornades complet \(^1\) to the under the Volumer (Fg 6 to 10) The op at a periform d November 8 Th tumo as os mill ad so me able and the storn his ola g this thirty was officulty into ct git me ddle thind a firm in g an end to ind a astomosis of the tv pic soft is stoma h. The I viringress dime as un s allowing the storn the gratter of the storn and the

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Case 3 is selected for report here because the \(\text{riy} \) film (\text{Fig ii}) suggested to a num ber of experienced roentgenologists and sur geons that the condition was inoperable. \(\text{Act} \) the tumor (\text{Fig i}) was easily removed with a good margin of healthy stomach and after its resection a suture of the type of Bilfroth I gastroduodenostomy could be performed. Another remarkable feature is that this patient whose chinical symptoms and physical examination pulpation of the mass and \(\text{riy} \) studies all indicated inoperability is ap-

parenth well today (February 19 8) to months after operation without a symptom of trouble while Cise 1 a being n tumor had the misfortune to succumb to a rare and impreventable postoperative complication. In Cise, the small and operable cancer hap pened to be of a high grade of malignancy and the patient died quickly of metastisis. The ection of the tumor in Case 3, which is shown in Ligure 14 is of a lower grade of milignancy than that of Case which is shown in Ligure 19.



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CLINICAL SURGERY

TROM THE UNIVERSITY OF KINSIS SURGICIL DEPIRTMENT

TECHNIQUE FOR THIROIDECTOMY

BY ARTHUR I HERT/LIR M.D. I ACS HALSTEAD KANSAS

Napproaching the operation fo the recction of a gotter the surgeon must have two prominent factors in mind. First the patient must be in proper condition for operation. If there has been a loss of weight, the patient must be gaining must be taking food with a relish and must present the proper mental attitude toward the operation. Second enough of the gland must be removed to assure the patient of permanent relief from symptoms.

PRE OPERATIVE PREPARATION

Toxic goiter patients are managed in the same way as other candidates for operation When they enter the hospital they are told that a period of rest will be required before they are ready for the oper ation but that they will be informed long enough beforehand so that their friends will have time enough to be present for the operation The non toric patients are told that they will require no preparation and that the operation can be per formed the following or any subsequent day The toxic patients are told as nearly as possible what must be achieved before they are ready If they have lost weight and have no appetite they are told that they must rest until they have developed an appetite and have regained some of the lost weight If they have lost weight and have re gained some or all of the amount lost and are taking sufficient nourishment but have a rapid pulse they are told that as soon as the pulse slows to 100 or less they will be ready. In a word they are informed with perfect frankness in all regards Everything that savors of the mysterious is care fully avoided In my experience this is much more effective than trying to steal the gland Most patients have friends who have undergone the operation and if their glands have been stolen the new patient will know of it and will be con stantly apprehensive as to the time of operation and each day will be one of anticipation surgeon must employ those qualities natural to

himself to gain the patient's good will. If he has a sense of humor he may kid his patient at times with advantage. It is fatal for him to essay a dramatic attitude when he is lacking in dramatic instinct. No one surgeon has a sense of humor and a dramatic instinct they are the anuthesis of each other. After all, it is the confidence the patient has in the surgeon that is the confidence born of experience that the surgeon has in himself.

grain of morphine given 2 hours before the oper ation and a like amount half an hour before the patient goes to the operating room. For slight and young patients this amount must be reduced. Pan topon in twice this amount is sometimes used. This drug is supposed to be less prone to be followed by nausea and vomiting than morphine but the advantage in this regard is very slight if there is any

nausea and vomiting than morphine but the advantage in this regard is very slight if there is any at all. Atropine is not used because it cau es flushing of the face and dry ness of the mouth the first wornes the operator and the second wornes the pritient. The use of scopolamine was discontinued long ago because some of the patients slept an altrimingly long time after the operation.

AN ESTRESIA

Anasthete Since all goiters except those of children are operated upon under local anæsthesia at the Halstead Clinic this method alone will be considered Novocain epincphrin is always used Since but a small amount of the drug is needed there is no question of safety. The solution is made at the table. Three 2 grain tablets are taken directly from the commercial container placed in a 2 ounce medicine glass and rubbed up with the plunger of the svinige. An ounce and a half of boiled water is added and the solution of the powdered tablets is assured by agitating the water with the syringe. From 5 to 8 minims of epineph in (1 1000) is removed from the bottle by means





f a medicine dropper which had been bailed with the instruments. Neither not cain n r a lr nalin 1 loiled Such olutions have rejente IIv I en teste l bacteriologically an l f un l to le sterile Novocain may be sterilized as parently without injury lut epinephrin uffers kieri rati n by heating A solution which shows the leat ting f clrshoullte rejectel This methol ha been illo ed no for 15 years and no undue agit it in from the effect of a lrenalin has I cen I erve I The advantage f this proce lure is that th tion 1 sure to be fre han 1 as it is prepare 1 by ne of the surgial assistants the perator u es the solution with the full confidence that it has been properly made No difference is made in the u.e. of epinephrin in the vari us type of goit r In highly toxic g iters there may be a pere pt ble agitati n while the s lution is being inje te l but this pas es off in a fe v minutes but ev n a light reaction is unusual. In sthe ia with in alone is not complete and loes not last m re that 15 minutes-not long enough even in the hand of an expert operator The addition of the a brenalin increases the duration of the une thesia by or hours



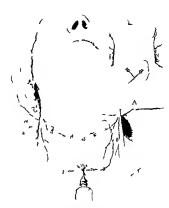
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The ad anta e tit cal an esthe in ire many A fe v of the more impressive nes may le men tione i The perative field a mai relatively bloodles The imp reant lo live sel ar realily ecounized and may be clamped left to they are cut The line of clea a e let ec 1 the clan land it capsule can be folloselly harp lic tin If c more in of the tracher i threatene! the gland can be so manipulated a to availate if the re u rent ner e i irritat l a larva cal r flex at once varus the operat r Thuill ffect figen eral anæsthetic are a alel Vervimi rtant i the fact that the urgeon ees hi patient in the table before anything ha been done. If the pa tient a stated the pration can be defired to another day No patient that is fearful f the out ome of the operation shoull be operated on SI htly a state I patients may be calme I I v gen tle assurance or by en a in them in irrele ant conversati n If the metho is fail the operation must be deferred. If a happens in rare insta ce the patient does not bear the operation well only one l be may be removed

The most fatal thing to the success of local anasthesia is to promise the patient that if necessary a general anesthetic will be given If this subject is broached the patient mut the categorically assured that local anasthesia never tails a surgeon who starts a local anasthetic with a general anesthetic in reserve is defeated before he starts.

inasthete atton. The patient hes on a flat table with a small pillow under the neck and shoulders and the occuput resting on the table. The pillow must not be high enough to cause the least emb ir rassment to respiration. In fat short necked pa tients the operator may be inconvenienced but the patient's comfort must be the first consider? tion. It is absolutely essential to make the patient comfortable Skilled assistants will keep the bga tures from falling on unprepared areas If the patient shows any disposition to cough a nur e is in readiness to hold a towel over the face. How ever the patient's face is not kept covered as any covering would be uncomfortable and would hide from the operator the chief index as to the state of the patient. The operator should secure as comfortable a position as possible preferably sit ting on a high stool. The surgeons in our clinic do not wear masks but they do keep their mouths shut With practice this can be done without pain If any one feels the urge to make a speech he is advised to reserve it for the staff meeting Studies of culture media in the laboratory have convinced me that quiet breathing through the nose does not infect the environment but talking invariable does Elaborate head dresses are uncomfortable to the operator and the strange appearance of the surgeon tends to agitate the patient A simple

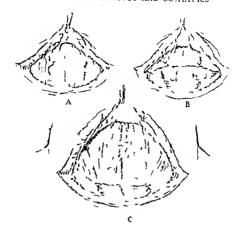
Lerfert instruments are essential easily working syringe with a capacity of 5 cubic tentimeters is used. The bore of the stringe should not be too large because the greater the diameter of the barrel the greater the pressure that must be applied to the piston and as the pressure increases the delicacy of the touch decreases These items are of great importance for on the delicacy of touch depends the ability to determine the tissue into which the needle has penetrated All acces sory apparatus such as pressure cylinders self filling syringes special needles and the like are to be eschewed because they are fatal to delicacy of touch and lead to the use of needlessly large amounts of solution The needles should be as small as possible and the points must be sharp and free from rust For skin infiltration a 6 gage needle an inch long is to be preferred and for the deeper infiltration an 18 gage needle 3 inches long should be selected. Any one doubting the



Γg 3 Th lines indicate the di ction in which the n cile 1 passed to infiltrate the inbloom mu cles. Lines to γρa s over the surface of the glan 1 r and g pass over the lover pole. The in crt shows the direction of the needle to r ach the surface of the lover pol

importance of fine needles and smoothly working syringes can convince himself of this fact by trying to infiltrate his own leg or better still have some unsympathetic associate do it. In my judgment it is the huge syringes armed with needles the size of trocars o generally employed that bars the general use of local inaesthisia in thyroidectomies.

The infiltration of the anasthetic As an introduc tion the gland may be gently palpated to accustom the patient to the pressure of the operator's fingers The initial prick of the needle is likely to try the patient's nerves more than any other step of the operation Therefore it is well to tell the patient that there will be a slight prick at the beginning This first pun can be materially les sened by picking up a fold of the skin it the point where the initial puncture is to be made and by compressing it half a minute between the thumb and index finger cau e an acute an mia The pre liminary prick can be made with very little pain at the point of maximum compression. The initial wheal should be made slowly lest the sudden ex pansion of the tissue cause pain. A row of wheals



is made along, the line of the proposed meason (Fig. 1) this being usually along one of the natural fold of the skin or on a line where a string of beads would naturally fall (Bartlett). The injection must be made endermically which is indicated by the prompt blanching of the skin. If the solution is injected below the skin anæithesia is not instantaneous and a needlessly large amount of fluid will be used. The entire extent of the proposed incision is inhibitated as the first step of the operation.

After the skin line has been infiltrated the antetion cervical nerves are blocked at the point where they curve over the sternomistoid muscle. The needle is intro luced in the anæsthetized line and passed along the me hal border of that muscle and just above it (Fig. 1A). The needle is then passed more deeply to reach the ribbon muscles of the neck, just beneath the sternomastoid. About 5 cubic centimeters are used in this step. Without remo ing the needle the surgeon their infiltrates the region in front of the tricher in order to an esthetize the region of the pyramidal lobe. This done the needle is pix sel bet cent the superior pole and the trachea? Pressure on the skin over the needle (Fig. 2) will mike the needle dip into this pace. This blocks the superior laryingeal ner es (Fig. A) and likewise ordematices the tissue bet een the superior pole and the trachea thus facilitating the delivery of the uperior pole.

The left si le 1 intiltrate l in like manner

The ribbon muscles over the goiter are no s infiltrated. Entered in the line of the primars kin infiltration the needle is passed into the muscles hing superficial to the glyind. Care must be taken lest the needle pass too deeply, injure the super ficial thyroid veins and possibly cause infiltration of the tissue making it more difficult to follow the line of cleavage. The extent of infiltration depend.

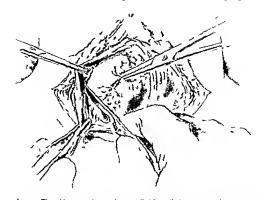


Fig 5. The ribbon muscles are being pulled lat rally by an artery forceps in the hand of an assistant and a thumb forceps in the urgeon's hand. The gland is being gently lifted by an artery forceps. The lands disserts the capsule from the surface of the latter.

on the size of the gotter Usually four lines are infiltrated representing lines 3 4 δ and δ in Figure 3 I or this step 3 to 5 cubic centimeters are used

Without removing the needle from the skin the surgeon next infiltrates the region about the lower pole. The needle is passed downward and outward as represented by line r and g in Figure 3. The purpose of this step is more to ædematize the its sue about the lower pole than to secure anesthe sia. By this means the line of cleavage is more reachly followed. About 5 cubic centimeters are used in this step.

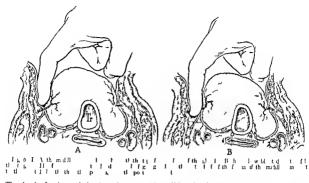
It will be seen that the amount of anæsthetic fluid used is only about 30 cubic centimeters. It is only in large gotters that this amount need be exceeded. The purpose of limiting the amount of fluid is not because of any fear of tourist but because larger amounts disturb the topography and make exact dissection difficult thus making impossible the anatomical exactness in every step of the operation which is absolutely essential

STEPS OF OPERATION

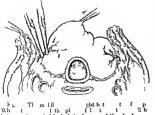
The incision As soon as the anasthetic haben injected the slin platysma and superficial fat are incised exposing the anterior jugular veins (Fig. 44). These veins are then caught up and the fascia is incised from one angle of the wound to

the other The severed veins are then ligated (Fig. 4B) It is essential that vessels be ligated as soon as cut The accumulation of many forceps about the wound is unsurgical poor mechanics and above all the pull and clatter of many instruments stritute the patient. Six forceps are enough and more than a dozen is an anachronism in any oper The fascial flaps are then dissected free from the ribbon muscles (Fig. 4C) A nick is made in the lower flap in order to give greater room for the mobilization of the lower pole. The ribbon muscles are not cut because this is not necessary and the myositis resulting from such injury limits the movements of the larynx after healing takes place The fascia is cut so as to give greater room. making it possible to remove the gland by sharp dis ection and in order to give a good view of the lateral veins without the use of retractors. There is no objection to cutting the fascia because heal ing is perfect without disabling after effects

Dissecting the pland free An incision is now made in the midline down to the gland capsule. If the ribbon muscles have been infiltrated to the proper degree a fine layer of codema will mark this plane. The edges of the muscles are now litted up with the aid of artery forceps in the hands of an assistant and a thumb forceps in the operator's hands elevates the muscle at the point where the strokes of the kinde are being applied (Fig. 5)



The gland is free l entirely by sharp di ection. If an attempt is made to use blunt dissection, the exact line of cleavage will never be followed. Here as in any other delicate dis ection the sharpest knift of tainable is the safest instrument artery forceps gra p the gland and makes gentle traction so that the glan I may be elevated as it is freed (Fig 5) The purpose of the forceps let it be emphasized is not to extract the gland but to elevate it gently after the knife has freed it. If traction is made on the forcers they will most certainly tear out in all toxic glands In frable glands a deeper hold is required than those indicate I in the figure



th md ll f fth f

When the gland has been about half freed the lateral veins come into sight (F1 64) The oper ator must see these vessels before hi knife reaches them They must be grasped by two forcen (Fig. ,) and a cut made between them This is one of the important steps of the operation. If the vein are inadvertently cut or torn a troublesome ham orrhage ensues the exact line of cleava ea forever lost and exact operating from then on a made impossible The reason for this i that at the point where the lateral vein enters the glan! the fascia divides (Fig. 64) one leaf going out to co er the carotid sheath while the other passes around the posterior surface of the gland (Fi 6B) Unless the last named layer is identified the capsule cannot be followed behind the gland and a proper delivery is impossible. Unless the gland 1 properly delivered the operator cannot know how much gland he i leaving nor an he deter mine the exi tence of pedicled lobe extendin be neath the sternum or between the trachea and rin secondary Likes use unless the tracheal rin s are palpable throughout the extent f the gland the operator cannot kno how much of the gland he I leaving behind Thi i the most important step of the operation from the standpoint of cer tain and lastin results

After the gland has been fully lelt ered the steps looking to its removal may be proceeded with

p le The uppe pole 1 Ligatin flesib grasped with a pair of forcep and a gently lifte!

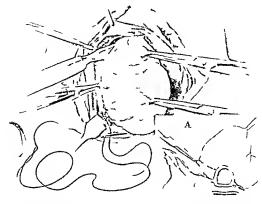


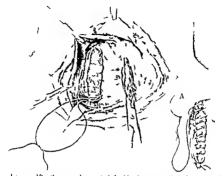
Fig. 10 Both polishan bin heat I Thighan II hid diviated by means of for ceps while III being, were d I hin or this thing joint no of the goade force and indicates the direction of this cut and this mount I gla I high I to be allowed to runnin

The index finger of the left hand (Fig. 8) supports the lateral side of the pole while with the handle of the knife the pole is separated from the trachea If the third step in the infiltration has been prop erly done this area will be without sensation and the slight cedema will make separation east. When the superior pole extends very high up gradual manipulation of finger and knife handle aided by gentle traction on the forceps will hring the top of the pole into view no matter how high up it extends (Fig 8) A Kelly forceps now replaces the knife handle and is gently pushed under the pole and raised up. One must he sure not to use the trachea as a fulcrum or the patient will be made to cough The pole is lifted up by the raising of the forceps (Fig 8) With the forceps we then gra.p the ligature and draw it under the pole. The hoature is then firmly tied thus securing the chief blood supply early in the operation A reversed needle holder or a special ligature carrier may be used for this step The forceps have the advan tage that they enable the operator to elevate the pole at the time the forceps pass under it This as ures a complete exposure of this part of the gland The ligature must pass around the whole pole and not through it

Ligation of the lower pole. The lower pole is gently lifted so that the inferior thyroid veins come

into view (Fig. o frontispiece). A ligature is passed under them and tied. At this stage the lateral hranch of the inferior thiroid artery may be pal pated and a loop passed around it and tied. The ligature is not cut but is pre-erved as a starting point for the continuous suture after the lobe has heen removed. This point is important especially in very fruble glands for it makes possible a firm hold.

Excision of the lobe After both poles have been ligated the actual excision commences. The index finger palpates the posterior surface of the gland and the point of excision is fixed hy means of a pair of forceps which serves as a guide (Fig. 10) The excision then begins at the upper pole and extends downward One definite spurting vessel is always encountered—the medial branch of the inferior thyroid artery which lies close beside the trachea at the level of the upper horder of the isthmus With care it may often be seen and grasped before it is cut. Other smaller vessels inconstant in situation and number will be en countered and are grasped with forceps as they are severed The direction of the cut and the proportion of gland left is shown in Figure 104. The trachea 1 always dissected clean If this is not done the portion remaining over the trachea is apt to enlarge subsequently which disturbs the patient



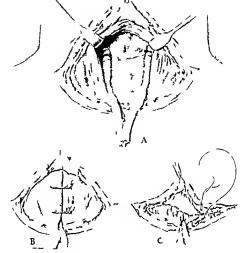
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subjectively and objectively. It is impossible to cover the trachea. There is no objection to exposing the trachea. If the capsule has been properly elevated from the gland at the beginning of the operation and the muscle fasca layer proper ment of fun tion of the trachea. If may be admitted that the tracheal triviation is greater the first day or two following operation when the trachea is exposed. But what i a day in comparison to a lifetime? The patient wants and the surgeon must have permanent results.

Securing the bleding tessels. The sature which vas used to hate the inferior thyroid veins is taken up and the needle is passed through the cut glands above the point of ligation (Fig. 17) in one or two places depending on the number of bleeding points encountered. It is then passed through the pedicle below the point of ligation and the suture is locked by throwing a loop over the needle as it is being passed through (Fig. 11) thus securing a double ligation of the pedicle. It is passed through the point of the pedicle. It is passed through the point of the pedicle.

the cut surface again above the pedicle. In the making of the Sweep the lateral branch of the inferior thyroid artery is included. The suture i no s tied to the tail of the original suture passed about the inferior thyroid veins. This secures the bleeding about the lower pole The cut surface of the gland is then whipped over from below upward care bein used to include the bleedin points which have been caught up by forceps When the pedicle of the upper pole i reached the suture is passed through the pole above the site of the ligature already in place (Fig. 11A) This is looped over the needle thus securing a double liga tion of the upper pole The cut surface is then again whipped over and the suture locked now and then about any bleeding points that may remain This step is continued until the stump of the lower pole is reached Then the suture is tied to the tail of the original lower pole ligature

In very friable or large goiters particularly those that are substernal the adjacent capsule or muscle fibers may be caught up as the suture i made Thi obliterates the dead spaces and gives



 $\Gamma_1=1$. A The rillon mu cl. arc, hown retracted while gauze drains are being placed over the raw urfaces of the glant B. The riblon muscles are gantly coapted with sutures. The gauze drains protrude through the lower angle |C|. The fascial being united by a running suture including, in this case the platy manual cl.

additional security to the hemostasis in frible goiters and in old goiters gives a lateral traction to the flabby walled trachea. This however is

used only in exceptional cases

Management of the second lobe

The second lobe is treated in the same way except that in the very exceptional cases one must be satisfied with the removal of one lobe. I no longer remove a part of the second lobe now I remove all or nothing. If it is seen to be inevpedient to remove the second lobe cleanly at the primary operation it is deterred to a second operation a week to several months hence depending on the condition and disposition of the patient. By waiting a month or two we may much more easily remove the second lob but in some cases time does not lessen the subley of the gland or its adhesion to the cap

Drainage During the very when I closed the wound investif I drained only the very toxic cases My assistants drain more frequently

perhaps about half of the cases was used because the fragility of the tissue made me fearful of late oozing. I have never drained with the idea of conducting off any toxic secretion which has been alleged to escape from the cut surface of the gland. There is no evidence that such occurs Since we know how to prepare our patients properly before operation such hy pothecation is unnecessary When a drain is used it must be of gauze. A rubber drain should never be placed in any wound that is expected to heal by first intention The rubber in the wound causes an exudation toward it This prevents coagula tion about the ends of the ligated vessels and invites late bleeding. Along the tract occupied by the rubber drain the exudate tends to produce a lasting fistula On the other hand gauze hastens coagulation and thus initiates the formation of fibrous tissue which permanently seals the vessels

The most suitable drain is a wick of gauze laid over the sutured surface of the gland (Fig 12A)

Closure of the aound The edges of the ribbon muscles are coapted by sutures usually two to four in number The muscle must not be con stricted lest a myositis be produced which would limit the movements of the tracker. After the muscles have been coapted the tran verse incision in the fascia is closed by a running suture (Fig. I B) The drain occupies the nick made in the lower facial flap (Fig 4) The skin is closed by staple sutures of dermal gut. The platisma may be grasped with the fascia sutured separately or neglected entirely

NOTES FOR THE BEGINNER

It is advanta eous to estimate the difficulty of the operation before the patient is brought to the table. Even if the patient is fit for the operation very hard fixed glands should warn the novice to be cautious because the gland is friable and removal will be difficult. It is in such cases that careful infiltration about the gland is particularly Exactness of technique and not the amount of solution is of prime importan e

If the operator has started and has his morale upset at any step of the operation by exces we bleeding it is best to pack the wound with gauze and terminate the operation. The best means of avoiding such an embarrassing state is to select only those cases which are in harmony with the operator's experience and to proceed with great caution bleeding points bein h ated as they are encountered in order to avoid a forest of instru ments which impede the movements of the oper ator The preservati n of the morale of the oper ator is best assured by a careful technique in which nothing is lone unless the operator is sure he is right. Most mistake are made by an at tempt at blunt dissection with an elevator or finger Blunt dissection in surfers is the mark and means of a poor operator and this is doubly true in regard to operations for goiter. In rare in stances however there may be an exception After the surface of an excessively friable gland has been exposed and the lateral veins have been severed it may be impossible to secure a firm grasp With the posterior capsule identified it is best to follo v the lower pole to the posterior sur face of the gland with the finger and thus to ele vate the gland Once the gland has been elevated

gauze can be packed behind it so as to maintain the elevation and control the hæmorrhage while the poles are being ligated If such a procedure has been necessary on the first side the second side should be deferred for another time

RI MARKS

Failure to secure satisfa tory results. There are two common reasons why patients are not cured an insufficient removal of gland tissue or a wron diagnosis

To obviate the first as much gland should be removed as is technically feasible. The inserts in Figures 10 and 11 represent the procedure which I employ in the avera e case. The severer the disease the more gland should be removed. This is particularly true in patients with goiter hearts in old colloid goiters. Here small nubs about the upper poles are about all that is left Even in such radical operations permanent my reedema is very rare Temporary thy rold deficiency is more com mon and requires foreign gland treatment for a These have been my most strikin cures particularly in the old cardiac patients Myt cedema is not to be dreaded. Latients on their

grain a day live in perfect comfort

Incorrect diagnosis accounts for many disap-Patients with rheumatic hearts pointments acquired in childhood may later acquire goiter These hearts are not cure I by gotter operations History and physical examination should preclude this error Less easy 1 the dia nosis of extraneous nervous symptoms in goiter patients. The pres ence of a goster do s not lessen the importance of a careful consideration of the general nervous state Early history and a study of other member of the family will aid. The nervous symptoms in thy rold intoxication differ from the vagaries of the neurotic When both conditions are combined the surgeon can but accept the proposition cure the gorter and have left a neurotic patient. It helps if one can evaluate each factor before the operation A micro copic study of the gland will materially help in forming an opinion before the patient leaves the hospital Failure to cure a neurosis should not be charged a ainst the sur geon A careful dia nosis clinically and patholog scally will help to make the statistics more favor able to the operative treatment of goiter

IROM THE CLINIC OF DRS ORR AND THOMSON

SPECIAL METHODS FOR THE IRLATMENT OF FRACTURE DELORMITIES OF THE FEMUR

BY H WINNITT OKR MD I ACS LINCOLA NEBRASKA h L I C 1 H p tal

AI UNION and shortening occur more fro quently in fractures of the femur than in fractures of any other part deformity is much more likely to be disabling be caus of the very important part played by the femur in all activities. In spite of that fact shortening and disability in fractures of the femur have been quite generally accepted as incritable Compensation insurance companies are usually satished to settle with a patient who has suffered a fracture of the femur on the basis of from 10 to 5 per cent disability and are thankful if there is no more disability than that

In compound fractures permanent disability has been considered to be almost unavoidable. In the opinion of the present writer this is largely for the reason that considerations of wound treat ment have been permitted to interfere entirely too much with methods of treatment for the

fracture itself

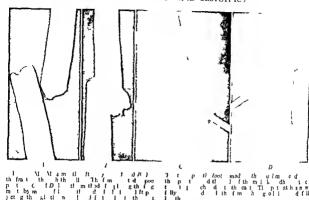
In compound fractures splinting methods and particularly our best splinting methods have been made subservient to wound treatment and con sequently immobilization in correct position has rarely been curried out. This leads to a high per centage of patients with malunion and shortening Many of these patients come to the hospital late for secondary care Quite commonly even those with severe disability are discouraged in their search for relief and a large number are turned away to carry on with their deformities and dis abilities becaus of the difficulty of the late cor rection of such conditions

Since a considerable number of surgeons were familiarized during the war with the us of fixed traction Thomas splints ice tongs etc corree tion is being done more frequently than previ ously Even plastic lengthenings of the femur are being done by some experts. Thes operations are not being done however to the extent that they should be Plaster of Paris has not been used as much as it should be partly becaus of the perfectly proper objection that with the ordinary methods of application length is difficult to maintain

The application of plaster with the idea of se curing proper position of the fragments by con

striction at the point of the fracture is quite wron, Neither should constriction at the foot be used in an effort to maintain length. In pur suit of a method to render plaster more efficient in maintaining length and to avoid motion of the fragments we have worked out a technique for the application of fixed traction in plaster that overcomes all of thes objections. We do not hesitate to refracture either by the open or the clos d method almost any late case of femur de Direct manipulation of the fragments is sometimes done by means of pins as illustrated in Case i In other cases we depend upon trac tion alone with fixation of the lower fragments of the femur by ice tongs and in still others the careful application of moleskin adhesive traction with the lower ends of the straps imbedded in the cast. This gives fivation with full length as well as satisfactory ammobilization of the fragments It is never necessary to have undue pressure upon the knee or upon the foot or constriction of the cast at the point of fracture. Both the patient and the fractured extremity are kept under complete control by means of adequate fixed exten sion in the plaster cast. The details of application are as follows

First the patient is placed upon a traction table and by means of a muslin bandage about the foot and attached to the traction device at the foot of the table traction is made upon both legs with the perineum firmly against the upright post of the traction table until full length and position can be maintained by the pull on the foot alone Second the knee is raised by means of a pull against the overhead bar with thick padding underneath the knee until the knee is flexed about o to 30 degrees Now the screw at the bottom end of the table is gradually tightened and the behavior of the fragments at the point of fracture is observed. If by traction and manip ulation alone the femur can be brought down to correct alignment and full length nothing more is required Moleskin adhesive straps are applied to the limb on both sides extending from above the point of fracture to the malleoli These mole skin straps are bandaged on by means of sheet cotton and a firm muslin bandage applied over



that The other limb is similarly brindly, id except that no moleskin plaster need to applied a double plaster of Pari since is just on up to the arm pits with a cross bir in duite cross bars between the lees

When the jlaster has Jeen I mished Jown to just above the malleoli and has set the lower ends of the mole kin traction straps are turned I ack over the edges of the cast and fastened into the cast by additional turns of the plaster bandage. In this way one locks the traction while the foct is still being firmly held in traction by the mushin bandage.

When the entire double spica has set down as far as the ankles the traction by the muslin band ages on the feet may be released. It will be observed that the leg does not jump brick into the east as is the case in the ordinary east.

Not the foot may be brou ht to a ri ht angle and after having, been covered with cotton is in cluded in the cast in correct position. The position of the fragments may be checked on the traction table if desired either by the fluoroscope or by Yray plates taken at the mile. If correct position cannot be obtained in this way open operation should be performed and the fragments brought into correct position by means of levers or some other means. A bone graft may be in a ried but this is usually hot necessary.

In many cases f open operation fixation of the lower part of the fixaginents by ice tong 1 to be preferred to the molershin traction method In such a case traction is applied to the foot as already described and the knee is supported in the same manner except that the bunda, es should be kept out of the way of the condyles so that there may be no interference in the placin of the coding. After position of the fix ments 1 obtained by manipulation through the inct ion pais may be employed if deserted as in Case.

To maintain the fragments in position for the time being the wound is closed in the ordinary manner the pins are left extending out far enou h beyond the skin so the ends of the pin may also le included in the cast. Without disturbing either the traction on the foot or the sur port of the knee the condules are prepared to receive the points of the ice tongs and these are driven in No trac tion need be made on the ice ton s While traction is not necessary gentle traction may be used if desired and the lower fragment of the femur may be gently supported by means of a pull entrer longitudinally or forward upon the ic t ngs Care should be taken that the handles of the ice ton s do not rest upon the crest of the tibia belo the knee

Now the operative inci ion in the skin at the point of fracture and at the point of insertion of

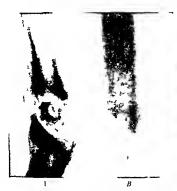


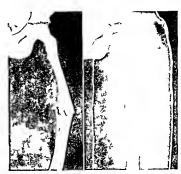
Fig 2 H H D Dudley s patient 1 Condition on June 20 1927 about 10 months after 11107 B Condition on September 21 1027 Ill sinuses and operation would were healed Patient was able to walk in cal per splint and with crutches

the ice tongs must be carefully covered with ster ile dressings and a double spice put on in the same manner so that the ice tongs are embedded in the cast and made a part of it. In the same manner as before the cast is carried down to be low the ice tongs and when the plaster is set the release of the foot where traction is being made by muslin bandages may be done without any disturbance of the fragments of the femur either as to shortening or rotation. There is no jumping back of the leg into the cast and the foot can be put in correct position and the cast finished with out any disturbance of the fragments of the frich tured femur.

In this manner perfect length accurate position as to rotation and complete immobilization are obtained. The traction need not be disturbed for weeks and recovery with the parts in correct position is assured.

I wish to report the following case which was operated upon with Dr F H Dudley and Dr Roger Anderson in Scattle Washington in June 19 7 As to operation and after care the conduct of this case was identical with many other cases that we have treated in a similar manner

Mr H H 4 years of a e sustained a compound fracture of the femur in July 19 6 Se eril operations were perfo med but in June 192 he presented the following condition



lig 3 Compound fracture with osteomyeliti and de formity 4 months after mjury. Saucerized and deformity corrected at the same time. Soundly healed in good position 3 months after ope ation. Only 2 dessin 8 were applied 1. Yoles vin adhese to phaster field in the cast at the table vasued for traction.

The re was marked outward and backward bowing of the femur in the middle third. The limb was about 2/ inches hort. There were two large sinuses draining freely through s ars on the interior and potenor surfaces of the th. h



Fig 4 Showing truct on and fixation of the lower fra, ment of the fractured femur by ice tongs embedded in the plaster cit. The ice tings vere left in for 4 weeks. End result - years later. The patient was 62 years old.



GASTRIC EXCLUSION

BY H B DIVINE MS FACS MELBOURNE AUSTRALIA

Honor ty S geo t 1 P tents St V neent Hose t 1 M lbourr A tew Lect gety M lbou L er ty A t 1

THE technique of gastric evclusion was re ported in SURGERY GYNECOLOGY AND OB STETRICS in January, 19 5. The principle of it is that provided the pylorus is patent one half or more of the distal part of the stomach is evcluded and left in continuity with the duode num. In my later cases I have made the section of the stomach obliquely (Figs. 1 and.) so as to include more gastric canal and evclude more gastric fundus with its acid producing glands. The oblique section also insures a greater intestinal alkaline regurgitation better gastric emptying into the distal segment and a more manageable intestine like evcluded segment.

The metbod of exclusion depend on the cir cumstances. It may be carried out by an anas tomo is after the fashion of a Billiroth II or a Polva or by the modified Polya anticolic method of Balfour. The more of the stomach that is excluded the greater and the more uniform the reduction of acid the quicker the emptying time and therefore the more con istent and better the

result

That the excluded segment gives no trouble but contracts comen hat and remains empty was shown at secondary operations on two patients about 12 months after the operation for partial gastric exclu ion that there are no by effects from it was manifest from the symptomless post operative course of the patients on whom it was done The closure of the excluded segment which 15 peculiarly easy 1s the only addition to the technique of a gastro-enterostomy and this is am ply compen ated for by the absence of untoward unforeseen uncertain effects often obtained in the double-exit stomach resulting from gastro enterostomy Gastric exclusion is an operation which was not designed for routine use but for pecial application in certain cases. In a few special instances no other operation can attain its possibilities both as regards lessened risk and permanent cure

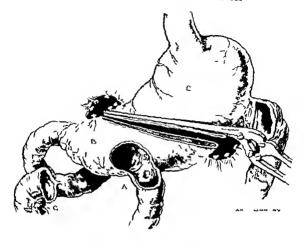
In what follows I shall attempt to define the precise application of gastric revulusion and to set out the particular kind of gastric or duodenal lesion in which I have found this operation of pecial use

DUODEN VL LICFR

In very old duodenal ulcers so great may be the callus and tumor formation that healing will not take place with the simple drainage and reduction of acid which gastro enterostom; gives The tissue is od amaged and thoroughly infected that even if healing does occur the infected area never really recovers its original vitality. In addition the scar tissue retains a residual infection which under the influence of some general or local depression of resistance even years after a gastroenterostomy may cause the development of an acute ulcer in this old scar and produce fatal ha matemesis

If the ulcer is penetrating and situated on the posterior duodenal wall healing is even more in tractable This class of duodenal ulcer is usually associated with a very high acidity and judging from our own clinical experience and modern experimental work the ulcer is undoubtedly caused by this high acidity from the very outset. Gastro enterostomy is notoriously uncertain in bringing about reduction of acid and it is doubtful if the most ideal gastro enterostomy can adequately re duce the very high acidities in this type of ca e So that in the circumstances-high acidity and old ulcer-to do a gastro-enterostomy is not in keeping with the best principles of treatment and is to invite failure sooner or later Gastro-enteros tomy combined with the removal of the very di eased old ulcer gives more prospect of perma nent cure but it is often almost impossible and even if possible very dangerous to remove some of these very old duodenal ulcers and even if resection is possible the gastro enterostomy may not adequately reduce the high acid Finsterer would do a partial gastrectomy and duodenec tomy in order to accomplish these ideals would do a partial oblique gastric exclusion which avoids the dangers of partial gastrectomy and the greater ones of partial duodenectomy and obtains the same uniform and consistent reduction of acid as does a partial gastrectomy and by perma nently excluding the diseased area the same cer tain and permanent healing of the ulcer

Gastric exclusion was done on 18 patients suffering from duodenal ulcer of this type. One very weak patient died as the result of the operation Three patients were operated on by Mr. R. C. Brown surgeon of the Alfred Hospital Mel bourne who has kindly permitted me to publish the results. He says. They are the best results I have had from any operation for duodenal ulcer



ig I tig I blip pings i so t politor Oblip dis of imach Wid cut the right luter is signished time time Bouled smet Cpt firesbook haratom simed Gitars book

If your operation will relieve the mind of the surg out of the arrivety of gr tro enterostomy it will be vorth while and as far as my experience speed it does so. In these patients Mr Brown divided the stomach 4 inches from the pilorus. He says — The patients are back at work, have no symptoms whitever are putting on weight and can eat anything.

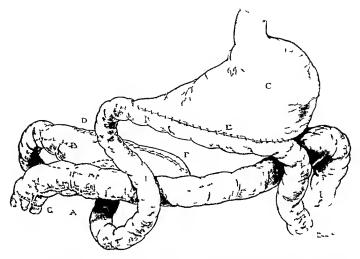
Besides being particularly suited to very old idens or those associated with very high acidity gastric exclusion will save much anwesty and heartburning to the surgeon if he uses it in place of gastro enter stomy in doulenal ulcer in women even though there is not a high rold. The female stomach with its low gradient a term hor rowed from Warzez lacks the physiological e-en using the meessary in gastro enterorioms, and this hypotomic stomach with its double evit allows excessive intestinal regurgitation which not in frequently causes a paise a flatelence and other

very unpleasant amptoms. The exclusion which is generally made a little marer the palorus in some a with its sin le exit in our experience never gives in a three unexpected by effects.

BIFFDING DUODENAL LICER

Under this head to problem of a very different nature may be presented. In the first I leeding, may occur in a very old ulter from ero and of a tair sized artery. Here revention of the ulter in addition to a gastro entero tomy it call disbut is not always practicable. In one very exsun, untated patient an oblique exclusion as in Figure it was done after a tran fusion with immediant, success and so far permanent cure

In the second the bleedin ma come from recurrin acute duodenal ulcer and it vill generally recur after a ga tro-ent rostomy. Here probably the exclusion of the ulcer bearing area is more important than any reduction of acid.



Fi 2 Second state of oblique pa tial gastreev lu on 60 J junal ulcer 1 Gastro entero tom. toma and jajunal ulcer B excluded segment E oblique anastomo 1 anticole which a oids kinking and insures regigitation where the afferent loop enters the stomach Similarly the almost transverse po ition of the intestinal loop removes any tindency to angulation and facilitates emptying into the efferent loop C portion of stomach to which anastomo is 1 made D juliumum anchored to excluded eigment to prevent angulation F suture line of excluded segments of tran were color

PREPALORIC LUICER TLMOR

It is not uncommon to meet with a large in flammatory tumor in the prepyloric region of the stomach. This generally arises from a penetrating ulcer and has extensive adhesions to vital structures in the vicinity. It is very difficult and in some cases impossible to remove such a tumor and when it is associated with a chronic perforation as it sometimes is this tumor presents almost insuperable difficulties to operative removal. In addition patients with these ulcer tumors are very sick cachectic and emaciated either because such an ulcer causes great debility or sprone to occur in very feeble persons so that it is obvious that there is not much latitude for the necessarily extensive operative manipulations

The following is a bistory of such an operative gastric problem

J male aged 50 years had been ick for many ye rs with pain hours after meal Latterly he developed in ten e epigastric pain and had finally become ery ill and rapidly lost weight and became ery cachectic. He appeared to be suffering from late gastric carcinoma. He collapsed in my rooms when he had a pul e of 130 and a tender and rigid epiga trum

Operation disch ed a very large inflammators and apparently irremovable prepylore tumor which had formed around a penetrating ulcer with a small chrome well localized perforation. Of course partial gastrectomy was indicated but the patient's cond tion would not permit of the e en if remo all were possible so a partial gastrecture exclusion was done in 40 minutes with no difficulty what ever. The patient quickly improved.

Our experience has been that gastro-enteros tomy would be quite madequate in such circum stances and could not be depended upon to give the same consistent and permanent result

A second patient treated in a similar manner gave a similar satisfactory result

It is here interesting to note that although the symptoms were at once relieved I should judge from observations on the local condition that it

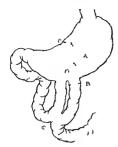


Fig 3 D animat with h g 1 t 1 g t 1 l o fo ju l 1 th t tm B G t ont tm stm th j j l u l -d t l 1 h w wh j ju m w d d d t t m f tu f tm h p o l j t d DF t who cd

took about, months for the very chronic ulcer to completely heal

The statement has been freely made that care noma develops on such ulcers. If the hypothesis accepted this operation may be regarded as a first state preparatory to a later easy and safe removal of the healed ulcer arer. But much recent pathological work appears to throw consider able doubt on this. The fear of cancerous degen eration of the ulcer then may be advanced as a strong argument against gastric exclusion in these very, sick patients.

HOURCLASS STOMACH

The great neakness of the patient was the main indication for gastric exclusion in an almost complete hourglass stomach on which it was done

The distal sac was disconnected and closed and a Billroth II was done a quick and easy operation. The patient is in perfect health after 12 years and has never had a symptom so that from this it may be deduced that the evcluded segment of the stomach does not produce any symptoms.

JEJUNAL ULCER

It is our experience that exclusion is of mestimable value in a few very weak patients suffering from jejunal ulcer. It has been and sith is our custom to remove the jejunal ulcer by an enterectomy and partial gastrectomy but this may not be prudent in jejunal ulcer with profound

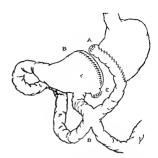


Fig. 1 Fit tlpfmg to ete tmy tmi i i i th ! ld dth lph ht phehd th Into b tm dwth the tman b G to et o t ew tm. (th; all) dan ldd gm t i ii tlpfmg tr t tm tm dd dd db db t a stm.

bleeding and with innumerable and cartilaginous adhesions resulting from many operations and especially if there is its agreat debility or if in addition the ulcer is in an old person. The risk is grave in such circumstances and may be avoided. In these patients it is an essential principle that more than half or perhaps two third of the stomach should be evoluded in order to reduce the acidity sufficiently and so as to keep clear and vell to the left of the jejunal ulcer and the adde ton area. This can be accomplished only by makin the section of stomach obliquely as in Figures 1 and 2 and the anastomous of the jejunam to stomach by the anticolic Polya method of Belfore.

The following are histories of patients who vere operated on by this method

had b B m ! 5 had b th f s and l td dth tom Igd H a lored 1 g Ibltat d d ~u sin cha t m 1 olon tr dtm try t tı of th m ny p wh h b f m # [` 11 1 fi mm t It ip tig t tm d tru t b nm tde lt w lih t m d ll t th I ft f th p Th dwilt th lft f llh pr pe tso t m h \$ d s ll dh n lw rk ng n lu n (F primd ptalg to nt t e

1 and 2) Three years later the man was in perfe t hallh and had gained two stone in weight. He has ne or had

a gastric symptom since hi operation

CISF 2 VI mal aged 73 year was a very ick man indeed. He had had three operation -one of them a mall partial gastrectomy-for jejunal ulcer Operation wa thought mady able becau e of his age and general con li tion but as he vas in great agony a ga Inc exclusion a decided upon This was quite in its tolerat d and go e immediate and complete relief. Two days aft r g Hing up and 3 weeks after the operation he dropped lad from heart failure probably as a re-ult of dr ca c of tle oronars

Case 3 D male aged 55 year This patient hal a history of duodenal ulcer for 20 years and we one of th worst I have ever seen During the h t 6 of the e verr he had three operations upon the stomach by thr e lif-ferent surgeons without reli f Severe pain vomilin and frequent copious hamorrhages had re luced the 1 at nt 13 a state of me ery and weakne s. He hved in daily te or of hemorrhage through which he had been aim 1 x angumated on three occasions. He was vir m ly pak and the upper part of his al domen howe If lapar tomy scars Rad ographic examination di closed i junal ulcer Operation revealed his stomach and box el tangl d i a confu ed mass by adhesions Separation of the di clo 1 an old gastro enterostomy and entero anastomo i with jejunal ulcer at the site of the former. The patient wa so ill and the state of his upper at domen so terrible 1ha1 it was considered wise not to explore the duo fenum. Th J junum was divided just distal to the jejunal ul er and both sides clo ed Somewhat more than half the tomach was excluded and the remainder anastomosed into the dis tal piece of jejunum (Figs 3 and 4) thus side tracking the ulcer and leaving it in a blind end the old entero anas tomosis remaining for the passage of the duodenal junces The patient 2 years later had quite recovered had gained weight and had no gastrie symptoms

It is conceivable that the retention of the entero anastomosis decreasing as it does intestinal regurgitation might predispose to a recurrence of the ulcer but under the circumstances it was difficult to do otherwi e

BLEEDING GASTRO ENTEROSTOMY

After gastro enterostomy a patient may suffer from repeated severe hamorrhages without the symptoms of chronic jejunal ulcer pain may be entirely absent. The patient may be quite well in the intervals. This bleeding which has its analogue in the bleeding duodenal ulcer prob ably arises from an acute recurring jejunal ulcer It is difficult to know how to treat these patients Partial gastrectomy is indicated but must be ex tensive and therefore unnecessarily mutilating in order to accomplish its object. For these I have performed extensive gastric exclusion with great satisfaction and very little disturbance

In these cases I invariably make the section of the stomach very obliquely (Figs r and) so as to include more of the gastric canal and exclude as much as possible of the fundus and its acid producing glands As I place the distal part of the jejunum to the greater curvature the obliquity also insures greater alkaline regurgitation As the excluded segment is drained by the first gastro enterostomy stoma it can be made very big Here is an example of such a case

II aged so years This man had symptoms of duodenal ulcer fie was operated on a duodenal ulcer was lound and a costerior ga tro enterostomy was done. For the la 14 year ince his operation he has had severe attacks of hæmatemess and malena in on of which he nearly did He has n v r had any pain after meal nor any other amptoms of chronic jejunal ulcer except perhap

an acidity which g nerally preceded an attack.

An a tensive oblique partial ga tric exclusion i as then

Here it was po sible to make a valuable compari on of the fra tional test meal and emptying time of partial gas tric exclusion with the gastro enterostomy where both the operations were done on the same patient

I action il test neal- hour readings Biceding gastro enterostomy Free acid to 45 55 20-

1, I mptying time I hour
After exclusion Free acid o o o o o o Fmptying time to minut s

This is quite typical of the results we have obtained in several of these cases and clearly shows that partial gastric exclusion gives a much quicker emptying time and a very much greater reduction of acidity than does the operation of gastro enterostomy

While it is not possible yet to furnish reliable remote results in the 40 cases operated upon some general conclusions may be drawn The results are just the same as for a partial gastrectomy of the same extent Like partial gastrectomy for duodenal ulcer if gastric exclusion is too limited there is danger of the occurrence of jejunal ulcer because there is insufficient reduction of acid Where from one half to two thirds of the stomach has been excluded in the oblique exclusion a uni form and satisfactory result both immediate and remote has been obtained. In fact it will give the very same results as Finsterer spartial gastrectomy and duodenectomy for duodenal ulcer with half the operative risk. As far as experience goes, this operation has been found to be practically free from any unpleasant after effects that often at tend gastro enterostomy and is an extraordinarily useful operation to as it were have up one's surgical sleeve

SURGICAL RESULTS IN PEPTIC ULCER

BY J TATE MASON MD PACS SEATTLE WA HINGTON

IVIDED opinion as to the ment of gastro enterostomy for peptic ulcer is current because both satisfactory and unsatisfactory results have been reported by capable sur go ons. With this in mind a study of the records of the patients who have been operated upon by us as been and while our group is not large we have tried to make up for the small number by an occurate personal investigation of most of the cas is. This study has reveiled some matters of interest in connection with this particular operation which may be worthy of note.

Blackford and Dwyer make a study at our chine of 2 soc consecutive histories of patients complaining of gastrie symptoms and found that only about 10 out of every 7 cases received a diamosts of organic less in of the stomach and duodenium Only 1 out of every 2 cases diagnosed as agstric or duodenal ulcer came to operation. In other words only about 10 out of every 2 to 6 these patients who came in thinking that they had some organic lesson of the stomach and complaining of what they thou it were symptoms of such disease really came to operation for peptic ulcer. One fundated in the words have been treated surgically of which 27 were gastric ulcers and 85 were duodenal ulcers were gastric ulcers and 85 were duodenal ulcers.

In this series the histories were all written and the physical evanimations were all made by competent internists. The average age of males with duodenal ulcer was 40 years the average age of males with general experience about the proportion of 3 in the male to 1 in the female. The age of males with gastric ulcer averaged 48 years and of females 41 years. Here again the proportion of male to female was about 2 to 1 in number.

The histories alone in 80 per cent of these cases pointed conclusively to peptic ulter. There was the story of bringer pain. In fact pain was the predominating symptom of peptic ulter. This pain was usually present from a few days to 1 few weeks with complete or practically complete remission of symptoms for months. It was usually one of three distinct types. The first type of pain due to intragastic or intraduodenal lesson was that due to excessive peristilities cation. In these patients shrip peristilities was callow each other. The increased peristilistics results from the increased secretion which is the result of the irritation produced by the ulter. The net mot 1 frequent pain.

of which patients complained and described as a gnawing sensation is due to the action of the hydrochlone acid upon the base of the ulcer. The third type of pain and that which is usually the most distunct of all is that of impendin perforation with associated acute inflammation in and about the base of the ulcer. This pain often smulates gall stone colic and is not releved by sodar or food as are the first types mentioned.

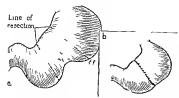
Tobacco habit has been noted in mot of the Instones of the male patients. Vomiting occurred in about to per cent of the cases. Harmorfus exarving in amount from very slight to very large occurred in about 25 per cent of the cases. A Falseen noticed often by other observers the major its of these patients complained of acute exacertations of symptoms in the spring and false.

There was a small group of patients from whom practically no history of gastric symptoms could be obtained and in this group some of the rup tured gastric and duodenal ulcers occurred. These patients give ab olutely no history of trouble up to the time of perforation. However on rechecking these cases some very good histories were clirited.

Next in importance to the history was the roentgenolo ical evidence. In this group of case there were positive errors of the roent enolo ist in operative cases 1 e a roentgenological diagnosis of ulcer was made but no ulcer found at operation. Negati e errors numbered 10 1 e a ne at e roentgenological diagnosis was made but to ulcer found at operation. This was a total portive a diagratic error of 15 out of 10 patients who under each operation. The errors were as follow 1 portive error and 3 negative errors for gastructure and the positive and 7 negative errors for disodenal ulcer at total gros error of 144 precent. Duodenatis was definite in 3 patients insted as 3 of the negative errors among the duodenal

Acute perforation occurred in 13 patients. Four died of these 2 were operated upon 4 days I was operated on 8 day after perforation and a woman ,0 years old was operated upon at 6 hours. Three patients with perforated gastric ulcer who were operated upon within 4 hours recovered.

There have been 1 5 operations for peptic ulcer upon 118 patients. One slee e resection vas done but the final realits were not satisfactory. Gastro enteros omy vas performed 2 years later with

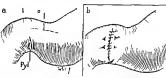


Fi i Sleeve resection. The final result was not also factory. Gastro entero tomy gave relief but the pair ni died later of car horenal break.

complete gastric relief The patient died later of cardiorenal break Two Horsley operations 4 Finney operations 4 Polya Bulfour operations 7 Judd operations 16 excisions and 90 gastro enterostomies were done. Of the patients who were submitted to the Horsley operation both have done well though a had a very stormy con valescence After a I inney operation a patient made an uneventful recovery while 3 had a con siderable amount of immediate postoperative trouble. One of these had persistent vomiting which was finally controlled by daily gastric lay age with a very weak solution of nitrate of silver One had a duodenal fistula which finally closed spontaneously The final results in these cases have been satisfactory. The 3 Polya Balfour op erations all gave satisfactory results except in i patient with syphilis of the stomach who died of pernicious anæmia 4 years after the operation Seven patients who had the Judd operation had a very even convalescence in the hospital and while the period of observation is shorter than that of any of the gastric operations the results have been most satisfactory up to the present

Of the 91 patients upon whom gastro enteros tomy was performed for peptic ulcer we have been able to communicate personally with 70 A physician spent from 15 minutes to an hour discussing with each patient his present condition of the 21 remaining cases 11 ded and 10 have been heard from indirectly through friends who have seen them within a year and 1 half after their operation

We are most interested in the number of deaths and the poor results in comparison with the good Following is a list of these results. There were 4 hospital deaths or 4.4 per cent. One of these patients made an uneventful recovery but died from pulmonary embolism on the fourteenth day as she was leaving the hospital. One died on the tenth day from a complete separation of the



It is peration The final results of 2 Hor les operation were satisfactors but 1 of the patients had a termy convalescence

gastrojejunal anastomosis. In this operation no non absorbable material had been used anastomosis had been made by especially prepared catgut welded onto a strught needle This we had thought would withstand the digestive action of the gastric juice. At the postmortem absolutely no catgut could be found even the knots having been absorbed by the tissues. The third patient died on the third day from pneumonia fourth died on the sixteenth day from postoper ative insanity A postmortem examination showed that the gastro enterostomy opening had fune tioned normally and that there was no peritonitis There have been 8 late deaths in this series 2 from what was undoubtedly perforation of a gastrojejunal uleer

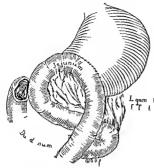
There have been 10 poor results that 18 12 6 per cent of the number of living patients have not had entirely satisfactory results

To patients each had a latge postoperative abdominal herma. In a third case the anastmonsis had to be disconnected on the seventh day because of persistent comiting. It was all the the third that the mesentery if the transverse colon had signed. This patient continued to complian of his stompost of the property of th

In a fourth patient the anastomo is had to be disconnected on the fourteenth day because of persistent vomit



Pho 3 Finney operation The final results were sati factory in the 4 pat ent on whom thi type of operation as performed but 3 of them I ad a stormy convalescence One had a duodenal fistula and another vomited per si tently



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TABLE I RESULTS OF ONE HUNDRED AND TWENTY FIVE OPERATIONS FOR PEPTIC ULCER

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The first and second patients each had no toperative herma but are very comfortable with snug fitting belts and no second operation seems adu able. There have been 3 patients operated

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71

upon with complete relief (the fifth seventh and eighth patients) which brings the unsatisfactory results to cas s or 6 g per cent of thos living Of 19 gastro-entero tomies which are functioning satisfactorily and all of which were done from a to 10 years ago gastrojejunal ulcers have been traced in only 6 cases or , 6 per cent

TEN CASES 12 6 PFR CENT NOT ENTIRELY ATLEMENT RY

Case 1 and 2 po toperative abdominal h r ia (m

fortable with abdominal belt Case 3 do onnected on seventh day M nt rv f transver e colon lipped diwn over provintal and li tal loops of rejunum

Cie 4 disconne ted on fourte nth day lectuse of per 1 tent v miting

Ca e pain and die mf rt. Op rati n was done 18 m nths later. Many perilu lenal and pyl ne adhesions

(a t 6 gastres junal ulcer li c nnected Relief C se ga trojejunal ulcer disconnected Relief Ca e 8 Lastrojejunal ulcer di c nnected No relief Creo Lastrojejunal ulcer Case 10 Lastrojejunal ulcer

FIFTELN PLRFORATIONS

Ther were 4 deaths in 15 cases with perforation Of thes two patients were operated upon 4 days after per f ration one 8 lays after perforation and one a woman v ars old 6 hours after perforation of the 1, cases 11 urvived

THE FREATMENT OF POSTOPIKATIVE PROGRESSIVE GANGRENOUS INFECTION OF THE SKIN AND SUBCUTANEOUS HISSUE WITH BLOOD FROM IMMUNIZED DONORS

BY J G PROBSTEIN MID IN MIJOR (SHILL MID TILES ST LEW MISSIUM t mb 5 g 1 bH rtl

THE object of this paper is to report a case of an unusual infection of the skin and sul) cutaneous tissue following incisions for the drainage of an acute breast abscess

In recent years this type of lesion has been studied and reported by Frederick Chri topher (3) Thomas Cullen (4) Brewer and Meleney () and Emory Alexander (1) At the American Sur gical Association meeting of 1920 similar cases were reported by Charles A Torter of Boston who referred to 3 cases seen at the Massachusetts General Hospital (5) Alexis V Moschcowitz of Yen York reported ca es that he had seen and Marshall Clinton of Buffalo mentioned 1 case that he had studied Arthur Marriatt Shipley of Baltimore reports a cale he had treated at the University Hospital (6) These contributions appear to make up the total recent literature on the subject

The etiological factors in this type of progres sive gangrene are not specific. One fact seems to be most impressive namely in each of the cases reported the patient had been very acutely ill with an infection requiring surgical interven tion which was in turn followed by a spreading gangrene

The organism found in the various cases has varied greatly The instructive work reported by Melenes (2) discusses the bacteriological findings of their cases in detail The bacteriological work in our case was done by Downey Harris

The phra e progressive gangrenous infec tion describes the lesion most accurately. The tirst thing to attract attention is an unusual brawny dark red appearance of the skin sur rounding the original site of operation accompanying elevation of temperature would eem to indicate that one has to deal with an exacerbation of the original infection. A second incision is made for the sake of better drainage but its edges are soon undermined and show a tendency to necrosis sloughing and gangrene

The undermined skin is free from the sub cutaneous tissue and a purulent secretion exudes from the advancing necrotic area. The edges of the wound bleed very easily but are not noticeably tender. In a variable period of time extending from several days to r or weeks another area of hyperamia develops. Another dark purple dis colored border appears and a new advance in the gangrenous field is seen The hyperæmic area is at first somewhat tender but not unbearably so As the gangrene advances leaving a raw granu lating surface the tenderness associated with this open sound becomes most exquisite. The infection spreads in an even fashion extending around the margins of the wound first making itself evident in one site and then in another entire border of the wound actually becomes a spreading phlegmon

The patient is not made unusually ill by each flare up of the infection except as the condition



progresses and overs a larger area of the belia As time passes however the igns of secondary anemia and loss of veight lecome more an I more As the skin is denuded and the subcutaneous tissue sloughs off the area of granula tion to suc becomes increas d in size and tender ness and shows no evidence of epithelization With the spread of the infection the discharge becomes most marked and profuse and the odor very offensive It is extremely interesting to observe the mild virulence and the insidiously persistent spread of this infection gnawing its was slowly but surely even eroding as in our case the cartilizations processes of the ribs and sternum (Fig. 2) The organism is absolutely rebellious to any form of treatment used in the treatment of ordinary injections such as the use of Dakin's solution mercurochrome or bone packs Violet rays sunlight and deep Vray therapy were in our case without beneficial After repeated incisions are made and various modes of attack attempted one commences to realize that surgery and the local use of drugs and rays alone are not the chief factors in conquering this infection. One then begins to think of other means of attack such as foreign proteins vitamines blood transfusions or other body building agents or in other word fi hting power to combat the infection

In the first case reported by Brewer and Mel eney various solutions \ ray and light treat ments were used to no avail. As a last resort, the

circumscribed the entire diseased area by incision through the skin and subcutaneous fat and packed the wound with a solution of 1 per cent formalin changed daily under gas anæsthesia. This seemed to check the infection in this case and at the end of 13 weeks the patient was discharged cured In the second case reported by them the same treatment was carried out as in the first case and the patient was discharged at the end of 11 weeks

The 3 cases mentioned by Porter were all cured ultimately by radical incision and skin grafting

The first case reported by Moschcowitz ended fatally after the gamut of all antiseptics and the actual cauters were used. The second case was finally stayed by burning a groove into healthy tissue with the Paquelin cautery. The cautery was also used with apparent success in the case reported by Cullen

In the ca e reported by Clinton a 10 per cent solution of sodium chloride was applied to the margin of ulceration and within a period of 6 days the swollen gangrenous ed e subsided leaving a clean healths ulcer which was followed by skin grafting and quick convalescence

Dr Emory seemed to have been succes ful in the use of a foreign protein in the form of adan This case eemed to have burned itself out after persisting for 10 months

Dr Shipley conquered the infection in his case by using the electric cautery

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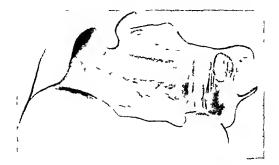


Fig. Detail drawing of the world and true a showing the denuded sternum and rib exposed

Li ter Tuhol ke wa call din on ultati n Thinkin that the infection had pread into the ther quadrant or that our first attempt at a le just dra n a e had not been succes ful e decided to inc e o r the newly inflamed area. The patient no looked II (as anzethesia was arain admini tered and the bratoj n d at the lower inner quadrant. Pu was evacuated and throu h and throu h draina c introduced Culture of the pus howed staphylococcus Irrivation with Dakin tion was started. It this period the pati nt de elop d a typical po toperative p ycho i which cau ed great concern he complained constantly of a se ere headach a com panied by irregular ieres of chill followed by incr a in temperature. The breatt as draining freely and we ould find no reason so far as the local condition was concerne ! which would cau e her to be so ill I earing that ome other condition mi ht be concomitant sith the brat infection we called Dr Englebach into consultat on

June 6 no other organic complication vase vident. The condition was considered to be due to a postinfe tion p vichos. The patient was put on luminal and torritive treatment.

June S the patient developed a eer chill 1p and nail became cyanotic. Whood cultur wa nevative Culture from the breast revealed staply lococcus aureu the patient commenced to complain of a new are a of extreme tenderness surroundure the two incr on. The two and on the two and on the sea of the sea out the old incr ion looked dark and appeared to be in a gain renou. In every all other areas in the breat a shoot commenced to look gain renous. Several day lat it these new areas broke down leaving dicharging, sinu es in the breast.

livest to Dakin's tubes vere placed in each of the snuces and daily irreation vith [e-h]s p epiced Dikin's solution were made \to apprecatle progress was made and an amount of di charge temps ture etc how din tendency to diminish

The entire breast now took on an atrophi d appearance the role bein dark purple From each of the mu c pus cruded feel. The purple From each of the mu c pus

evuded f eely. The margins surrounding the e openin s were undermined and between everal of these openin s it skin was entirely f ee from the underlying to use. The

p tent was unquestionable lo in-ground her temperature run ed from nod eterres to to devere dails with an occa i nal exacerbat on u hered in by a chill and followed by a r in it imperature to tog de reis. We have what this was n tan rd nary infection but in pite of repeated cultures no! In teould be thrown on the situation.

ii) Au u t to the breast tool, on such an appearance that it as thought best to do a imple amputation leaver all margis sopen so as to allow free drainage. This the patient refu ed to permit and must ted on leaving the hopital. Mere staying at home fo a week, the patient eturned and con ented to the irriple amputation. The breat the amputated August 30 inci ion being

made ide of all necroite it sue. The infection at this time d d not penetrate beneath the face a All margins were left wide open to maintain adequate den name. Vilcor copic examinati nof the breat by Dr. Olch revealed the fol. I me. The pecimen No. 1002s, consisted of a breast exit of with overlin skin. The nipple was retricted thin e ou purulent material e uded. Section of the breat howed diff ret ab coe so One of the e e tended through the breast and lay upon the pectoral fascia. There was no gro e idence of main nant change. Micro copicilly the breast is sue showed a fairly extense of how there is a marked round cell infiltration. Ab ces ed.

areas er made up of solid ma es of inflammat ry cell ndicatn a prorte sin ma titt. There was no eidence of mali nane. Ad a no 1 of chronic suppurative mastitus was male. I ollowin the r mo al of the breat the patint half quit 1 rie in temperature and the wound drained not the control of the control of the patint half quit 1 rie in temperature and the wound drained not the control of the patint by the patint part of the patint patint

quit 1 n e in temperature and the wound drained not feel). How er she had become so e tremely sensitive that to irrivate with Dakins ollution was out of the question Solution of imercurencitome saline and boric were rosted to Iventually hovever enthe had to be dontinued on account of the pain. They cound was left open to the air and per odically baked under incande centerathon lamps.

September the pat ent commenced to complain of pain in the area extend n down toward the avillary pace and it is noticed that the skin there had taken on a red





a (left) Sho ing the sound 400 days after the fr toperation. The entire area 1 healed except clo e to the axilla where ac essors mammary gland form a mech n ical impediment

Fig 6 Showing the appearance of the vound is months after the on et of the inf c tion In area of o teomyeliti is een over the sternum

consisted in keeping the wound clean and applying plain sa el ne dressin s which could now be done with le s dis comfort to the patient

the wound margins were commencing to fill in The secretion was much less and the patient had Lained 3 pounds in wei ht May 19 10 pinch grafts from the thi h were tran planted to the wound under local anvetle in and in to days it was evident that all had taken (Fig 4) On May 30 35 pinch grafts were taken from the thi h and placed on the wound All but 6 took

June 1 wa the first day since the on et of the infection that the patient pa sed through 24 hours with a normal temperature On July 5 the entire wound had become covered and healed except for an area where the infection had eroded the sternum and eaused an osteomy elitis and anothe area close to the arilla where an accessory mam mary gland formed a mechanical impediment to the com plete healin (F1 5) The patient was discharged on July

to after havin spent almo t 3 o days in the ho r tal June 1 1928 the patient's general condition was very good She wei hed 165 pounds and was con idering goin The wound was practically healed save for a clean granulatin area the size of a thumb which still persisted where the mammary gland interfered with complete healin This we felt would have to be dealt with by plastic urg r, at a later date 1 small amount of

di charge un een to come forth from the old area of o teon yeliti in the steenum (1 i. 6)

RILLEL NO ES

- 1 ALEXANDER F C Po toperati e prendin superficial gan-rene Ann Surg 10 6 lvvviv 46t BREWER CEORGE I MFRSON and MFLINEL FRANK
 - I AURANT Pro re sive gangrenous infection of the skin and subcutaneous ti ues followin, operat on for acute perforative appendicitis \nn Surg 19 6 IXXII 438-450
- CHRISTOPHER I Severe preadin carbuncular infec tion of the chest wall following rib resection under local anæsthe in Surg (hn N \m 1924 1) 95- 10
- CULLEY THOMAS S A pro ress ve enlargin ulcer of the abdominal wall involving the skin and fat fol lowin draina e of an abdominal ab ce's apparently of appendicial origin. Sur. Gynec & Obst. 1924 TYVIII 579-58
 5 PORTER CHARLES \ Tr \m Surg \ss 19 6 xliv
- SHIPLEY ARTHUR MARRIATT Pro ressi e gangrenous ul cration of the abdominal wall Ann Surg 10 8 1 vv n 45

INTISTINAL KINKING

BY NORMAN M GUIOU M D O T & O THE

An endeavor will be made in this paper to show by experiment both with tubes other than intestine and with intestine at the autopsy table that intestinal kinking has a definite etiology on which can be based befinite prophylactic and therapeutic measures.

Search of the literature reveals nothing on the mode of production of this phenomenon (except the doubtful Lane's kink) but does show that the En, lish surgeon Rowlands previously expressed the writers clinical views that intestinal obstruction due to kinking occurs following operations and during peritonitis where it is mit takenly called partly tie distention of the by wel

In the writer's opinion paralytic ileus is a surgical entity does not exist as only the transient intestinal inhibition following peritoneal insult or the last tate of an obstructed bowel is of this nature During the period of inhibition more prolonged in case of peritonitis gas is produced and this inflates the bonel which as will be shown later causes it to kink. Were the howel not kinked the gas would immediately escape through the rectal tube Gas pains-the beginning of postoperative symptoms-are due in the writer s oninion to reco ered bowel contracting against obstructing kinks. Having consulted scientific friends in a fruitless search for information on kinking in tubes the virter has developed the follo sing conception him elf

kinking is a phenomenon in which the cir cumference of a tube tends to flatten to a plan when the tube is bent through the arc of a circle It can best be understood in it imple t form by taking a half tube of inelastic material such as paper (Fig. 1A) It will be seen that 1B an 1CD are of equal lengths. If this half tube b bent into a circle it vall be seen that 1B an 1 CD form circles of equal circumferences and therefore EF becomes a straight line. If we make this half tule into the ar of any circle no matter how large ET becomes a straight line. If now we take a complete tube (Fig aC) and attempt to bend it so that the zone LF forms the are of any circle whatever the two hemicircumferences sraighten out int two straight lines and a kink is fried Let us call the line EF the approximation line of a link the convex part of the tube wall over the kink the cap the under part of the kink the angle and the double walled partition formed by

contact of the limbs of the kink v hen the an leas acute the spur The cap at ET is held down on top of the spur by the resultant of the force which made the bend therely forcibly occuding the lumen of the tube

FACTORS FAVORING KINKING

The less closic the time the more readily while the Los and estimate directle tube we fin list can be bent to a certain extent without linking as its outer circumference can clongate. It will be sent that a Becomes longer than CD. Once the limit of elestricity is reached kinking occurs (Fig. 2c). This can be applied at once to the lumin bowel. Into time with its wall stretched by dilatation covered with fibrinous equidate or infiltrated with intrumeral inflammatory product has its elestricity immarted and kinks readily.

The larger the tube the more readily at kinks This issum is extremely important for on it the pathogene is of intestinal kinkin largely depend If we take a lar e and a small tube and berd them we find that the large one kinks when slightly bent but the small one may be made into a very small circle vithout kinkin make use of the axiom in choo in a smaller pipe to make a difficult bend. Humbang ca or es specify how far their pipes can be bent vithout tucklin, -smaller sizes bending much further Collapsed bowel will lie in very small coils with out kinkin, but if the intestinal tube is enlarged by air inflation it readily kinks when held in circles the maximum diameter of whi h is the inside of the abdomen and the maximum radius of which is the len th of the mes nters

A kink may be complete or incomplete depending on whether or not the cap is in complete context with the spur It may be free or have its limbs field to ether with abunous equality or held by the mar ins of an aperture between transperienceal band etc.

The normal intestupe lies in a serie of in complete free kinks. If the inte tinal diameter is increa, d with gas distention these kinks may become complete and form a series of resist ince offerin obstacles the sum total of which i obstruction. As a rule the obstruction due to free kinks is not seriou. It prod read N to it at ment, and the kinks di appear with the differential in the between summals, however it is the though the production of the kinks of appear with the differential in the between summals however it is not serious to the series of the ser

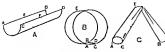
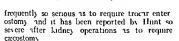


Fig 1 Kinking analyze I



ONSTRUCTION IN KINKS

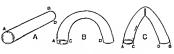
Factors favoring obstruction in kinks may be conveniently studied with a length of thin walled eigarette drain tubing with one end clamped and an atomizer bulb fied into the other. If the tube is merely rounded out with hir it kinks readily Because of the transparency of the cap the spur can be readily seen. With further pressure by the atomizer bulb the proximal limb of the kink dis tends slightly then the approximation line which has been straight is seen to arch up in the center and the gas passes the kink. Any factor there fore which will prevent the upward rising of the cap will make the kink more obstructive. Hold ing the approximation line against the wall makes it totally obstructive. It is highly possible for this to occur in the pelvis. Loss of clusticity at the cap will also keep it from rising This might result from the stretching of the wall to its limit or from adherent exudate. A kink in a garden hose (traction kink) is totally obstructive at once becaus of the inelasticity of the wall of the tube

PRACTICAL APPLICATION

Cas formation The diameter of the intestinal tube is kept down by preventing the formation of gas. For the first 36 hours after laparotomy patients receive warm water only by mouth then if there is no distention they receive full fluid diet. If there is any tendency to distention however the patients are given acidophilus milk until the tendency has disappeared. The great value of



Fi 3 larieties of kink 1 free kink B f ed k nk C held kink D traction kink (arden ho e kink of doubt ful occurrence in the intestine)



Is 2 Kinking in an elastic tube

acidophilus milk was impress d on the writer several years ago by the following cas

CASE I A farmer was admitted to the hospital 5 days after the onset of acute appendicitis. The abdomen was a mess of pus and fibrinous exudate so that drainage alone was established Distention set in and increased in spite of frequent doses of pituitrin after which the patient passed much flatus limils on the fourteenth day I re opened the abdomen The peritonitis had cleared up but the small bowel was 3 inches in diameter and showed several kinks firmly fixed by fibrinous exudate begin The bowel was about the same ning to organize size on each side of these kinks so they were not completely obstructive. They were freed and the abdomen was closed. The patient was in excellent condition for about a week. After that dis tention set in again and increased until he was as ill as before with the abdomen greatly distended and tense Pituitun still caused some firtus to pass I reasoned that if we could check intestinal gas formation we might save him Acidophilus milk was tried with a most spectacular result. In 4 hours the abdomen was flat and patient made an uneventful recovery

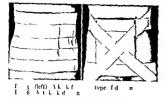
Since then I have given acidophilus milk for several drivs preparatory to lapitotomy. A local darry milkes the milk and patients drink it at home before they enter the hospital. It has worked admirably as a distention preventive One case in particular in which prevention of distention was very essential illustrated its value—though such a large ventral hermi which was repaired with living suture fascial transplants. The abdomen with its returned bowel remained absolutely flat and soft.

Thomson Wilker and Everidge use the in testinal antiseptic dimol preparatory to kidney operations to prevent distention

Intraperatorical evadate Wound evadate es pecially in the pelvis cements loops together



Fig 4 Knk at rest and kink v th gas pa sing



and forms fixed kinks-the omm in dingerous Therefore great care should be taken to pentonealize raw surfaces and cover them with omentum. The prompt stamping out of pertonitis with intraperitoneal intiserties and the raising of the patient's resistance with blood transfusion and ultra violet light baths are also important

The dilate! intestinal coals should be left free to form arcs of the largest possible urcles tight postoperative dressings. The pelvis as it is the smallest cir le in the abdomen must be watched closely as it is a danger zone for kinking If loops which he there flaccidly at autonsy are held down with a hand over the pelvic brim and inflated with air they are bound to kink Loops held in the nel is by pressure from above or by exudate from intrapelyte surgical wounds are sure to kink if only moderate distintion occurs In the writer sopinion the most likely explanation of Handley's Heus Dupley is pel ic Linking and not the fact that the howel is lying in a pelvic ool of pus as frequently happens with infrequent seriousness. In this connection a popular type of postoperative dressin in which strips of adhesive stretch tightly across the lower abdomen from one that crest to the other is not above reprotch

The writer now uses no transverse strips across the lower abdomen but holds the lower end of the gauze dressing with a strip which runs from trochanter to trochanter (Fig. 6) and crosses at the symphysis and not over the pelvic brim. The upper transverse strip is very loosely applied The adhesive is cut along 1B o hours after opera

tron and loosely taped

If the gas is blown past the kinks early the kinks will tend to disappear The writer uses pituitrin fre ly and early even in intestinal cases believin that a blow out at an intestinal suture line is less liable to occur from pituitrin on a compara ti ely healthy bowel than from constant press re



prt myfll em alofa de n sae thutut

of kink locked gas on a boxel wall rendered anamic from the pressure

Case 2 An em Lenes colon r ction to side of it um to mid transi ree beg n t distend 30 bours after operation. The anti-kink dr sing had been so ut that the bdom s s fr pand The pate at as g en 4 doses of cub c c ntimet r each at five minute and passed much flatus through the rect I tube Thre grains of c lomel as giv n by mo th a d acidophilus m lk as started W th the as t c finally of another dose of fu din there as a good bowel movem at from the calomel a d the abdomen remai ed soft and flat

SERIOUS CASES

If symptoms persist after initial t extment vith infundin gastric lavage with small tube colon arm ation and acidophilus milk a fixed kink is probably p esent. Unequal abdominal distention clear return from a colon arra ation or malodorous somiting are indications for interference even Catheter jeju though some firtus be pa sin nostomy as a first stage should be seriously con sidered as the e cases are poisoned and with all our modern supportive measures often resuscitate poorly after relaparotomy It is not quite the life

saver we had hoped however as kinks in parito nitis cases may be multiple and the catheter 1run a limited segment of bowel Sampson Handley recommends the heroic procedure of draining the jejunum into the transverse colon by ana tem) is and draining the colon by a cæco tomy lite cas s of this type are vet a little bevend our pres at efforts and challenge further re earch into the intestinal toxins which make them such bad risks for relaparotomy

SLMMARY

While there may have been a transient upset of intestinal physiology kinking and not paralytic ileus is the pathology of ordinary postoperative gas pains distention and obstruction

The occurrence of kinking can be rendered le s likely by keeping down the intestinal caliber by diminishing gas production with acidophilus milk by applying loose po toperative dres ings es pecially over the pelvis and by eliminating early the gas formed during the period of inhibition

When interference is imperative the question of doing a catheter entero tomy previous to ob struction relieving relaparotomy should be en ously considered

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THE CURE OF AN INTRACTABLE VESICOVAGINAL FISTULA BY THE USE OF A PEDICLED MUSCLE FLAP

A NEW CONCEPT

By JOHN H GARLOCK AB MD FACS NEW YORK [th New 1 kllosp 1 FmbS d g 1D

THE earliest pages of medical history give proof of the fact that the subject of vesicovaginal fistula has always mented consid erable attention on the part of surgeons Hippoc rates made mention of the fact that it was a relatively common condition and due usually to a protracted labor From that time on while the subject received considerable discussion nothing definite regarding the possibility of ob taining a cure was brought forth until 1663 when Van Roonhuysen of Amsterdam suggested the use of sutures as a means of closing such a fistula The next important advance was made by Jobert in the early part of the nineteenth century He suggested and practiced the transplantation of the labium of one side to be placed into the fistulous opening as a plug Agnew in describing his method says The circumference of the fistula being drawn down was freshened a flip was raised from the inner surface of the labium and being turned into the opening was secured by a number of statches a catheter was kept

constantly in the bladder during the treatment In one case the growth of hair the follicles of which were in the flap induced a vaginitis

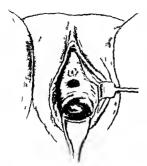
Next came the important contribution of J Marion Sims This consisted of the following I The use of a speculum which permitted of

thorough exploration and ready accessibility to

The introduction of a suture which would remain a long time without inducing either irn tation or ulceration The introduction of the indwelling catheter

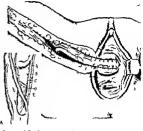
I ollowing the publication of this work the incidence of cases cured by operation rose very Numerous modifications were offered notably by Agnew But all in the final analysis embodied the same principles In 18,3 Agnew reported 60 cases with a deaths and 5 failures certainly a remarkable record

Mackenrodt in 1894 made the next notable ideance. He recommended the separation of the vesical and vaginal walls from each other isola

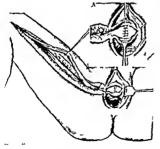


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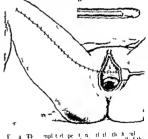
tion and closure of the fatula and then a parate uture of the caginal muc sa. This was indeed a great improvement over Sims, method of inver-



sion suture of Under and vaginal walls comlined. The final conception of the regain process s involved in the closur of these hotula was reached



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when it was realized in the early part of the twentieth century, that in addition to Macken rod's principle it was necessary to mobilize the bladder extensively before a cure could be regularly expected

This then brings us to the situation at the present time. Most surgeons are agreed now that the operative cure of vesico aginal tistula is described upon the following factor.

dependent upon the following factors

r Fashioning of vaginal flaps the bladder wall being thus separated from the vagina

2 Inversion of the fistulous opening by rews of sutures 3 Extensive mobilization of the bladder. In

12 this regard Watkins recommendation for mobil 12 tion as far as the broad lightner attachments 13 probably too radical and unnecessary

4 In high fistulæ the use of the mean recommended by Schuschardt whereby greater recesses of the valuates obtained. This step applies particularly to

fistulæ following hysterectomy

5 Approximation of the vaginal flaps over the repaired bladder in such a way as to place the suture line at some distance from the suture

line in the bladder wall

6 The use of an indwelling catheter. In this connection it is interesting to note that Sturmdorf reported in 1925 a case of fistula cured by his tracheloplastic operation following which no bludder drainage was used. Incidentally in cas s in which the fistula is situated near the cervix the procedure earned out by him should ment serious consideration.

7 Careful postoperative care aimed at the

prevention of cystitis

Apparently a combination of two factors favors repair mobilization allows the bladder to contract and thus to diminish the size of the opening at the same time lessening tension on the suture line and mobilization also favors the gliding and displacement of tissue planes one upon mother so that brond raw areas come into apposition

A study of the literature indicates that the acceptance and practice of these principles results in cure in the majority of instances. However not uncommonly a case will not respond to this form of treatment and recurrences develop operations are performed again and again and still the fistula recurs. One author reports eighteen operations on one patient without obtaining a cure. Barring the presence of constitutional disease the cause for each recurrence seems to be a local one. The base of the bladder soon becomes converted into dense scar tissue of great vulner ability and the viginal mucosa becomes markedly

atrophed I ach operative attempt at cure crus s more tissue slough and a vicious circle is established. In the past heroic measures have been adopted by surgions to alford these patients some relief from a most distressing disease. Thes have ranged from suprapubic cystotomy to obliteration of the vagina distal to the fistula adding thereby a vaginal pouch to the bladder and even implantation of the ureters into the rectum by the Coffey operation.

Such a cise came under our care a year ago Thick well plunned and well executed operations had been performed in an attempt to cure a fistula situated near the vesical neck. After each operation the fistula recurred while the patient wis still in the hospital. After the last operation the fistula measured 3/6 of an inch in dirumeter and involved part of the urethra. The bladder was markedly contracted and its base was converted into dense sear tissue fully 3/6 of an inch in thickness. The vaginal mucosa was atrophic and lined by encrusted unnity salts. It was evident that this problem had to be approached from a different standpoint than ordinary considered in the treatment of vesicovagnal fistula.

It was finally decided that three factors had to be considered and they proved to be of the

prestest importance in effecting a cure

The use of an attaumatic technique in the performance of the operation. The importance of this point has been repeated y stressed in our work in tendon surgery. (See Annals of Surgery January 1926 and January 1927).

2 The interposition between bladder and valural mucosa of a layer of normal tissue of good blood supply and of known resistance to infection. In other forms of surgery such tissue has been exemptified in a peduculated flap of muscle. A fascial flap was considered but was discarded because of its thinness and its susceptibility to infection.

3 The use of continuous intrivesical suction carried out through a retention catheter in order to keep the bladder dry at all times

The history of this case is reported in detail because it is felt that the operation described offers a different concept of the repair processes in the cure of intractable vesicovaginal listula and opens up a wide field in the future development of this type of surgery

Case Report Mis C B agel 44 years Ameri manued was admitted to the hop that in North 1927 for the repair of a recurrent vesscovagnial istula. SI c hall hid four full term pregnances. Lach Jalor had been noted a bing very easy. She liad also had four abortion throw the had been induced. In her past his tory the following important lacts were determined. On Cotol or 25 1918 a

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When the patient came under our care in April 1927 examination showed a urethroxesiovaginal fistila measuring \$2 of an inch in diameter. The bladder was greatly contracted and its base was replaced by dense seri tissue measuring \$5 of an inch in thickness. The vaginal mucosa was thin atrophic and bled easily. The vagina was limited by encrusted urmary salts. (Fig. 1)

We were here confronted with a two fold proposition In the first place it was necessary to

close the fistulous opening and secondly the reprir of the divided sphincter had to be considered. For two weeks prior to the operation the vagina was carefully prepared by daily douches helped by intermittent suction and the bladder was irrigated daily with acriflavine solution. On April 26, 1927, the following operation was per formed.

A transverse incision was made in the anterior vaginal wall on a line with the fistula (fig. 2). A large posterior flap of vaginal microsi was dissected backward with great difficulty because of the dense scartissue. A smaller interior flap of microsi was likewise fashioned the fistulous openin and the urethra being thus exposed. Two structures which were thought represented the divided ends of the sphiniter were repaired with interrupted stitches of fine chromic catgut. The base of the bladder was then mobilized well outward on both sides and the fistulous opening closed with interrupted mattress sources of chromic catgut in two

layers (Fig. 2A) After changing gloves gowns etc and re draping the patient a longitudinal incision was made on the medial aspect of the ri ht thigh exposing the gracilis muscle (Fig. 2) Its lower nerve supply was divided and the muscle was cut across near its insertion. It was then turned upon itself dividing its upper nerve supply but leaving its upper blood supply intact. The major portion of the incision in the thinh was closed with chromic catgut for the fascia and silk for The upper extremity of the thigh the skin incision was then made continuous with the inci sion in the vagina by cutting across the vul a The gracilis muscle was then transversely placed transver ely across the base of the bladder over the renaired fistula and held in position by interrupted statches of fine chromic catgut 3) The valunal mucosa was then sutured

(f) 3) The valual mucosa was then satured or the muscle with interrupted chromic catigut statutes and the remainder of the thigh wound and wha repaired (Fig. 4). The bladder was nashed out with saline and an indwelling double catheter (Fig. 4A) inserted. The vagina was packed tightly nutli nodoloring gauze. In order to immobilize the thighs a triangular shaped molded plaster splint was placed between the thighs in such a way as to separate the knees. The aper of this splint pointed toward the vulna.

The inner tube of the indwellin catheter was connected with a suction apparatus. The inner extremuty of this inner tube was situated at a point 3 of an inch from the inner end of the outer tube. This was done to prevent the pulling in of the bladder mucosa by the force of the suction.

The postoperative care of this patient was tedious and it was necessary to attach the great est importance to the minutest details. It was found that the inner catheter had to be changed every 48 hours to insure continuous suction This intravesical suction was muintained for a period of 24 days. On the fourth day after operation the patient was taken to the operating room and the vaginal packing was removed The anterior half of the posterior vaginal flap was found to be sloughing The muscle however was intact and apparently united to the bladder There was no leakage Following this the patient was dressed every other day in the operating room the treatment consisting of irri gation of the bladder with acriflavine solution prolonged vaginal douche repacking of the vagi na and readjustment of the indwelling catheters The immobilizing splint was maintained for a period of 24 days

A superficial infection developed in the middle of the thigh wound but this soon cleared up There was considerable cedema of the lower half of the divided right vulva. This was thought to be due to a vascular change incident to its division into two parts. This cedema soon subsided

On the day that the suction apparatus was re moved May o 1927 there was no evidence of any leakage and the patient voided voluntarily about every 2 hours the quantity at each voiding measuring 2 to 4 ounces This voluntary control continued while the patient remained in bed She was allowed out of bed on May 6 1927 On this day it was noted that there was less control of the bladder and a little spilling occurred through the urethra She was discharged from the hos pital June 5 1027 Following her return home she developed a mild phlebitis of the right femoral vein This subsided after about 3 weeks

At the present time the situation is as follows the wounds are healed. When the patient hes down she has complete control of the bladder so that upon arising she is able to void satisfactorily When she is up and about for any length of time and becomes tired there is not infrequently a discharge of urine through the urethra states that at times she feels she is able to contract the tissues around the neck of the blad der and thus control the outflow of urine This however requires considerable effort Examina tion at the present time shows the following the thigh wound is firmly healed and there is no impairment of motion as a result of the trans plantation of the gracilis muscle The right balf of the vulva is slightly deformed. The urethral orifice is somewhat patulous and easily admits a

No 20 F catheter In the recumbent position there is no leakage of urine Stretching across the base of the bladder is felt a ridge of soft tissue measuring about 2 inches in its interoposterior drameter and extending from the right to the left side of the base of the bladder The vaginal mucosa is smooth and glistening. The patient feels that she has been considerably improved by the operative procedure

It is felt that the limit of improvement as re gards voluntary control has not as yet been

reached

SUMMARY

A case is reported of the cure of a large urethro vesicovaginal fistula by the utilization of a pedunculated muscle flap taken from the inner side of a thigh in the form of the gracilis muscle In addition use was made of continued intra vesical suction extending over a period of 24 days without any evidence of vesical infection. It is felt that the findings presented constitute a new and additional concept in the management of cases of intractable vesicovaginal fistula

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RESECTION OF THE CÆCUM AND ASCENDING COLON

HOW THE MORTALITY MAY BE REDUCED BY MODIFICATION OF THE USUAL OPERATIOAL

By ARTHUR A SALVIN MD NEW YORK

CLUSIVE of the rectum the parts of the colon most frequently involved in malig nant disease are the two most mobile portions namely the execum and the sigmoid in a large series of cases studied by Judd (3) the incidence was as follows execum and ascending colon 159 hepatic flexure 29 splenic flexure 24 descending colon 46 transverse colon 75 and sigmoid flexure 292 Thus in 5 per cent either the execum or ascending colon was involved

Nearly all authorities are agreed that the proper treatment in operable cases of carcinoma originating in the execum or lower portion of the ascending colon is resection of the entire ileocacial coil of intestine as high as the distribution of the middle cobe artery accompanied by an anastomo sis between the ileum and the transverse colon or some other short circuiting operation. Without surgical intervention cancer of the execum in evitably gives rise to early intestinal obstruction. Although attended with a high mortality resection of the execum prolongs life and the patient may pass his last days in relative comfort.

Charles Mayo and Hendricks (5) report that of 257 patents with carcinoma of the right segment of the colon subjected to operation during a 10-year period 141 are known to be dead 34 cannot be traced 55 lived from 1 to 4 years 25 lived from 6 to 8 years and 12 are alive from 8 to 9 years after operation

Considering the gravity of the disease for which the operation is performed we find the end results of resection of the cæcum and ascending colon comparatively good except for the high immediate mortality which is said to vary from 15 to 45 per cent The situation has been well stated by Judd (4) of the Mayo Clinic as follows mediate results from operating for cancer of the colon have been rather unsatisfactory and the mortality is altogether too high. On the other hand the ultimate results in patients surviving operation have been very satisfactory as com pared with operation for cancer in other regions so that if we can develop some standard tech nique for the operation of cancer of the colon the ultimate results will be very successful There are several types of operation The ideal operation is resection in one stage with anastomosis

Aside from malignant disease the most important indications for ileocæcal resection are tuberculosis of the creum and chronic ileocolic intussusception

MEASURES ADVISED TO LOWER MORTALITY

Crile (a) has employed the following technique in an attempt to lower the mortality from resection of portions of the colon. A two stage operation is preferred and the freal stream is short circuited to exclude the field of operation. An iodoform gauze pack is used to prevent contain mation of raw surfices and protect the retroperitoneal space against infection. Crile resorts to wide resection to prevent recurrence and employs radium and deep roentgen ray, therapy

Rankin (6) advises resection of the ascending colon and end to end anastomosis with a Murphy button Two points of suspension are selected one at the head of the crecum the other at the point on the transverse colon where the ileum is to be anastomosed. In freeing the cæcum one should not attempt a digging operation While mobilizing the upper angle of the ascending colon the operator must be careful to avoid in jury to the retroperatoneal duodenum Kankin restores the continuity of the intestinal lumen by open end to end anastomosis between the ileum and the colon or by end to side anastomosis He prefers the former technique and uses two layers of tannic acid catgut in the anastomosis first suture unites the mucous coats of the bowel the second layer the serosa After the mucous stitch has been put in the lumen of the bowel is held open by blind introduction of the thumb and forefinger

When complete cancerous obstruction of the colon is allowed to develop the patient necessarily suffers severe toxemia and is rarely able to sur vive an extensive operation. Even without complete obstruction in the most important cause of the mortality from the customary operation of resection of the ascending colon and intestinal anastomosis. If the suturing should he imperfect or there should happen to be a poorly anastomosing circulation in the sutured ends of the intestine intestinal leakage is very likely to occur and cause pertontis.

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Fig The to cute ds fth ilum re cu d by pu e trin uture The me entery of the mail t te is sprted

The shock of operation too is necessarily considerable Should the unesthetist report danger during the resection of the carcum the surreon must nevertheless continue the operation at least to the extent of performing an intestinal anastomosis. To be sure should the condition be very alarmin he may order the angesthesia stopped and leave an ileal fistula. But ileal fis tula produces such unfavorable effects that it should be avoided whenever possible. It would seem desirable therefore to modify the usual operation to the extent of removing the danger of facal contamination and devising an operation that may be interrupted if necessary at any time

ADVANTAGES OF REVERSING OPIRATIVE STELS

By a simple expedient I believe that I have been able to eliminate the most obje inonable features conductive to the high mortality from resection of the execum that is by reversin the usual procedure and fit is performing intestinal anastomosis and then excision of the di-eased colon. A one stage operation is still used although it may immediately be converted into a two stage procedure should occision demand

What are the advantages of the reversed procedure with regard to the danger of infection? The colon is a heavily contaminated area. As soon as it is opened the danger becomes great With perfect technique it is possible to effect a completely aseptic anastomosis bett een the ileum and the transverse colon but the extensive manipulation and evision required in connection with the mobilization and resection of the cecum are bound to result in more or less leakage Especially is this the case vhen the intestinal current has not already been short circuited for mentalsis is not completely inhibited even when



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the intestines are exposed and the fæcal contents tend to exercise some degree of pressure a ainst clamps and sutures of the area to be rejected

If the anastomosis has already been established the natural current of the freed matter toward the sigmoid flevine is not mole ted therefore the pressure against the area being resected is appreciably lessened and the degree of contamination is thus definitely dimmished

Another important fact is that when the pro edure that I advocate is followed such con tamination as takes place from resection of the execum occurs at the close of the operation whereas when the usual method is adhered to infection is more likely to occur early in the operation While the delicate s ork required for the anastomosis between the ileum and the trans verse colon 1 being done there is no breach of asensis Such contamination as necessarily results from extensive resections of the cacum may be handled adequately by suitable drainage. In the great majority of cases no drainage is re outred It is only when asepsis has been imper fe t or the retroperatoneal space cannot be clo ed that I consider this precaution necessary

A theoretical adiantage of some importance is the fact that the facal current is not interrupted during the course of the operation for when the occum is clamped off preparation for when the cacum is champed off preparation; to its received a short circuit of the facal stream has already been established. When the occum is or ed first a temporary artificial intestinal obstruction is produced from the moment then the clamps are first applied to the segment to be removed and it lasts until the anastomosis to only the operation of the operation of

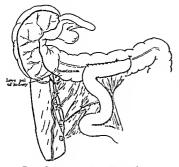


Fig 3 Separation of colon to hepatic flexure

temporary intestinal obstruction results in a cer tain measure of toxemia for it has been fully established by experiments on dogs that following the artificial induction of intestinal obstruction definite chemical changes in the blood appear within a relatively short time. It would seem of advantage therefore to utilize a procedure that avoids even a temporary intestinal obstruction.

Once the intestinal anastomosis bas been established the operation may be discontinued at any time whereas when the cæcum is resected first it is necessary to complete the anastomosis Should the patient's condition become unfavor able during the resection of the cæcum in the reversed procedure that I am advocating operation may be discontinued at once. If the cæcum has already been mobilized and the resection is well under way it may be left outside the abdomnal wound to be removed at such time as the patient's condition permits.

TECHNIQUE

In performing anastomosis of the ileum to the transverse colon followed by resection of the cacum I bave largely followed the technique described by Victor Schmeden (1) in Chritigische Operationsiehre pages 356 to 363 My results have been so favorable as to impress me with the superority of this procedure over the method customarily practiced

The type of ileocecal resection here described is applicable to the treatment of neoplasms in tussusception and tuberculosis of the cacum

A long pararectal incision is made on the right side to expose the site of operation. It may be

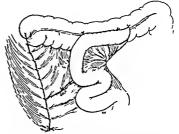


Fig 4 After the removal of the ascending colon and closure of the transverse colon the intra abdominal operation is finished by closing the defect in the posterior pentoneum

prolonged upward or downward according to indications A small incision is not desirable as it may prolong the operation and increase the difficulties. When the tumor is exposed the patient is placed in a moderate Trendelenburg position with the right side a little higher to keep loops of small intestine away from operating field.

The intestinal anastomosis should be effected before beginning resection of the crecum. Two firm ligatures are placed at a point about 6 to 8 inches (15 to 20 centimeters) above the ileocecal valve and the intestine is sectioned between them with the thermocautery or phenolized scalpel. The two cut ends are then folded in and sutured or secured by a purse string suture and the pads changed. Step by step between two ligatures the mesentery of the small intestine is separated from the part of the intestine still united with the excum. The direction of this mesenteric separation depends on the degree of involvement of the mesenteric lymph glands.

The next step is the implantation of the proximal end of the ileum into the transverse colon. This is accomplished by a lateral isoperistalize apposition through the tæma coli and a wide anastomosis. Many operators employ the Murphy button for this purpose. Being easily accessible through the incision the middle of the transverse colon is used. The anastomosis is then replaced into the abdominal cavity, which is well filled with new pads.

The excum is resected as follows. It is drawn toward the median line and the outer fold of the peritoneum is cut away from its lateral and lower borders. No important blood vessels are en

countered in this procedure. The execum is then brought further from its source toward the median line so that its posterior extraperitional portion becomes visible. Then the right ureter is exposed as it turns downward over the peass major muscle. In this way it may be protected from injury. The intestine now hangs on the median fold of its mesentery, which contains the large blood vessels prissing to the electrical realization.

The next step is gradual separation between ligatures of the inner fold of the mesenters while the cæcum is being lifted upward. How much of the mesentery must be taken with the cacum depends on the degree of involvement of the lymph glands Inlarged glands are most likely to be found at the points of origin of the ile xolic and right colic branches of the superior mesenteric arters. A large portion of the posterior abdominal wall must be denuded of peritoneum When the ascending colon is detached upward the lower portion of the duodenum is encountered. It must be arefully protected from injury. To one side of this retroperitoneal loop of duo lenum lies the right kidney. The mesenters is detached and ligatured and the ascending c Ion Irawn forward up to the healthy portion The central ligatures must b very carefully place i as any break would result in severe hemorrha e lhe fir t li ature in the mesen ery is placed cloc t the intestine

The excum itself has no mesenters The closure of the end of the large intestine does not differ in principle from that of the small intestine but it is more difficult as such intes tinal stumps are easily perforated. A prelimina cy closure is made with ligatures according to Graser's method Then two or more infolding sutures are maile according to Lembert's method and the appendices epiploice are sutured over them or the stump may be protected with omentum. It is important to cover a portion of the intestine behind the stump with peritoneum so that the suture may join surfaces covered with serous membrane Then the stump is repeatedly infolded until the closed end is near the posterior abdominal wall With this method of closure the intestine can usually be returned to the abdominal cavity but a drain may be placed near it as a precaution Usually no drain is required. It should be u.ed only when the surgeon is not ure of his asensis and there has been difficulty in closing the retroperatoneal space Schmieden opposes sutur ing the stump in the abdominal incision as this procedure is apt to interfere with the circulation or stretch the mesentery

Although extensive this operation may be performed with very little loss of blood except

in the case of widespread lesions. It has the ad vantage of avoiding the necessity of leaving an ileal fistula should the patient's condition be come alarming at any time since the intestinal anastomosis is completed before the resection of the execum is begun

If there are numerous adhe ions the difficulties of the operation are increased. In such cases it may be advisable to perform a two-stage opera tion If the second stage of the operation is to be performed a few days later the abdominal wound may be left open for the most part and the portion to be resected shut off from the rest of the abdom inal cavity by tamponade. After the involved portion of intestine is shut off so that excal matter does not pass through it the wound may be closed so as to leave a fistula of only this portion Then re ection may be done several weeks later In such cases not only the excum but also the hepatu slexure should be excluded. In some cases complete resection is impossible and the ileocxcal region can only be excluded from the rest of the intestine and radical operation not done

CO CLUSTONS

I I esection of the excum and part of the ascendin colon is usually indicated for malgnant disease in this locality also for tuberculosis of the excum and chronic ideocolic intussusception. In malignant disease it relieve intestinal obstruction prolongs life and greatly lessens the paterns a discomfort.

2 Although the end results of ileocacal re ection are good there is a high operative mortality

following the usual operation

3 Infection from freed contamination surgical shock and towning from temporary intestinal obstruction play a large part in causing the high

mortality from ileocæcal resection

4 By reversin the usual procedure and per forming the decodic anastomosis before exising the excums we may greatly reduce the mortality Should the patient's condition become alarming during, the course of the operation the latter may be discontinued at once. Furthermore the danger of infection and toxemia from temporary intestinal obstruction is greatly diminished.

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EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

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AUGUST 1928

CO OPERATION OF SURGLON AND PEDIATRICIAN

NE factor in the recent progress of sur gery has been the co operation of the internist and surgeon in the pre opera tive preparation and postoperative care of the patient Co operation of pediatrician and sur geon is even more essential because few sur geons are well versed in the care of children particularly infants. To meet this situation a number of children's hospitals have been so organized that all children are admitted to the medical service and the surgeon acts as a consultant as do the otolary ngologist ophthalmologist and other specialists. This mode of hospitalization aims to secure proper attention to the nutrition and general health of the child

Every child who is to undergo a surgical operation necessitating general anisathesia should have a general physical examination within the 24 hours preceding operation in order to rule out the presence of acute infection especially of the upper respiratory tract as well as any of the infectious diseases and also to be sure that the nutritional condition is such that healing will proceed normally

after operation One of the most glaring mis takes is to admit patients to hospitals for tonsillectomy on the morning of the operation sending them directly to the operating room without previous examination and without even having the temperature taken. It is therefore not surprising that postoperative complications and even sudden death occur so frequently.

Next to circumcision the operation most frequently performed on very young patients is for hare lip and cleft palate. This group of patients presents a definite nutritional prob lem for many are markedly undernourished because the deformity has prevented them from nursing at the breast or has made the taking of food difficult. For a surgeon to operate on a patient who is several pounds underweight is to invite not only operative failure but possibly the death of the patient Feeding by gavage for a period sufficiently long to bring these children up to practically normal weight will insure freedom from marked febrile reactions bring about prompt complete healing and reduce mortality to practically nil

The co operation of surgeon and pidiatrician is particularly necessary in the care of patients with pyloric stenosis. Many patients recover by medical treatment alone but a certain group requires surgical attention. Operation is sometimes delayed in these cases until the surgical risk is unnecessarily increased. A bad surgical risk may, in 24 hours be transformed into a fairly good surgical risk by means of blood transfusion proper intravenous injection of glucose and physiological sodium chloride solution by hypodermoclysis. The

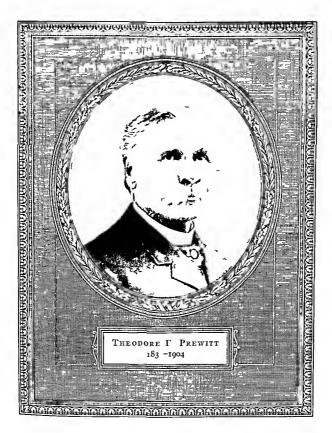
MASTER SURGEONS OF AMERICA

THI ODORE FRELINGHUS SEN PREWITT

THLIE are many men whose teachings beneficent influence and good example are curried along indefinitely through succeeding generations with out proper credit being given to him who deserves it. So it might be with the name of Theodore F. Previtt. His writings would make a considerable number of large volume if they were compiled in such form. He wrote no textbooks but his teachings will undoubtedly bear fruit for many years because his pupils and assistants are widely distributed throughout this midwestern ter ritory. They are practicing and teaching and so are disseminating that knowledge which they have learned from their chief and master.

Theodore I rewritt was the son of Joel and Mary Trimble Prewrit. He was born in rural Vissouri at Fryctie in Howard County on March 1 1832. By the death of his father who left a family of eleven children thus schoolboy was thrown upon his own resources at the early age of 14. It is said that he was employed for a time as a black-mith's helper. This may explain the reason for the tremendous development of the muscles of his arms and shoulders which give him the ability to evert that great amount of force which in addition to his acquired skill attracted attention whenever he reduced fractures and dislocations some of which had defied the attempts of others to reduce them. By perseverance and industrious application he acquired as good in education as was possible to obtain at a Missouri couotry side and this enabled him to teach school for a number of years. He entered St Louis Medical College and gradu ated in 1856. He married Miss Mary Ingram of Virginia during the semior year of his medical course and at once began the practice of medicine at Ulica Missouri.

Upon the death of his wife in 1862 he came to St. Louis entered into practice and soon became identified with medical education teaching dermitolog, at the original St. Louis College of Physicians and Surgeons. Later he became demonstrator in anatomy and assistant to the chair of surgery at the Missoun Medical College. In 1871 he was married to Viss Viary, Sowers who still survives and in that year he was appointed superintendent of the St. Louis City. Hospital. Three years later he resigned this position to continue his surgical





studies at the European medical centers. Upon his return from abroad he accepted the chair of principles and practice of surgery at the Missouri Medical College and later was for several years dean of this institution. After the consolidation with the St. Louis Medical College in 1800 to form the Medical School of Washington University he continued in this same professorship. Only when his advancing age and failing health prevented it during the last 2 years of his life did he fail to lecture regularly. This disability was due to arteriosclerosis and several light strokes of apoplety. He recovered fairly well from the resulting hemiplegia but finally succumbed to a severe cerebral hamorrhage on October 17 1904.

I or a quarter of a century he was chief surgeon to St John's Hospital and director of St John's Surgical Clinic. It was here that his most important work was accomplished and that material gathered which he presented at his frequent appearances before medical and surgical societies the meetings of which be attended with great regularity.

Besides other offices held by him at various times he was president of the following organizations. St Louis Medical Society (1876) Missouri State Medical Association (1897) St Louis Surgical Society. American Surgical Association (1900) and the St Louis Obstetrical Society. He was also a Fellow of the American Medical Association and of the Philadelphia Academy of Surgery.

' Be not the first by whom the new is tried

Nor yet the last to cast the old aside

This rule he frequently quoted and always kept in mind. Thus he made him
self exceptionally useful in the application of accepted methods. But this motto
did not lessen his eagerness to learn the latest innovations and he never he i
tated to apply any procedure which seemed practical in the light of scientific
reasoning. Living and working as he did in a period of great progress in medi
cine and surgery he saw these developments at close range and utilized the new
discoveries as promptly as their worth was recognized.

When in the year 1893 the daily press announced the discovery of the rays by Professor Roentgen Dr Prewitt immediately appreciated their great value in the field of surgery. With the intention of using these rays in his practice he forthwith consulted Prof. Charles O. Curtman and several others who were familiar with induction coils and Crookes tubes. The apparatus of that day was too small and weak to give practical results. So he could not apply this new discovery as soon as he wanted it. The matter was dropped for a short time only to be taken up again when a more powerful coil and larger tubes had been invented and manufactured. During this period Dr. Prewitt manifested an extraordinary spirit of impatience and annets which he never entirely lost. He left this world before the X-rays could be properly controlled and their application established as a distinct branch of medical practice.

I am able to give only a vague idea of his clear and logical reasoning which was usually followed by definite and positive conclusions nor can the proper comprehension of the remarkable diagnostic genius of this man be drawn from any account that I might picture to those who did not at some time or other have the privilege of duly contact with him. In those pre \ray ray days he as tounded those associated with him when he recognized by exclusion of other possibilities a small esteosarcoma which grew from the glenoid process of the scapula and when he proved his contention by a subsequent surgical procedure

At another time he made a diagnosis of ectopic pregnancy twice in the same fallopin tube. This was long before blood cell counts were a daily routine. At its first occurrence he strongly urged operation. The woman persistently refused but recovered rifter a fairly long period of illness. A few years later he found the same condition in the same fallopian tube. This time he was again certain obtained her consent by pleading with the patient and verified his diagnosis at operation. The spectimen showed the recent rent with the usual extravisation of blood and also the cicatrized site of the earlier rupture in that same tube. May these two illustrations suffice to show the extraordinary diagnostic ability which came only from many years of study and ob eviation coupled with an innate fitness for this work! Such a combination is seldom found

His resource/ulness was another outstanding and characteristic trait. I will narrate but one occurrence to illustrate this. A woman had suffered great loss of blood at an uncompleted abdominal operation attempted by another surgeon. She vas nearly ex angunated. Blood transfusion was not done in those days. Not even the apparatus for infusion of salt sofution was at band. With a David son bulb syringe (the forerunner and predecessor of the fountain syringe). Dr. Prewitt pumped enough stenie normal saline solution into the woman's veins so that she recovered. A small nozzle had been scraped to make it still. maller so that it could be introduced into the opened em. This patient vas later successfully operated on for the then eusting uterine fibroid.

Probably the only semblance of a hobby was his fondness for the works of William Shakespeare. He must have devoted considerable time to this study because he quoted from them whenever occasion offered the opportunity. It has been said that he was able to continue almost any quotation begun by others.

Professor Prewitt's most brilliant work was done in the clinical amphitheatre which institution is now fast becoming extinct. There he repeated to the students those methods of diagnosis of which he was master and which endeared him so with the large classes of medical students of that day geons of his time were satisfied with a simple amputation of the breast for carcinoma he dissected out the avillary and ubclavian gland. Thus he anticipated the radical operation as it was developed atterward. His percentage of

permanent cures was correspondingly greater than that of his less radical con temporaries

Bulliantly daring were his dissections of the neck for tuberculous glands or malignant disease and plastic surgery had a particular attraction for him. In all of his operations he showed a disregard for speed and spectacular show. His aim was toward thoroughness and ultimate results.

The published writings of this great teacher are many and varied. They cover a large part of the field of general surgery and sometimes they invade the other branches of medicine. But they give only fair idea of his great courage and determination which were always evident to those who had the advantage of being associated with him in his work.

It can be readily imagined that such a man would soon feel the need of a medical library and therefore he started the movement to organize a medical library in connection with the St I ouis Medical Society and headed a committee appointed for that purpose as early as July 1 1865. They reported on September 30 of that year and the adoption of this report established the first public medical library west of the Mississippi River. It was housed for a long period of time in the Public Library but later formed the nucleus of that great collection which now is igain known as the Library of the St Louis Medical Society If my St Louisan has contributed more to the advancement of medicine and surgery in the city of St. Louis than did Professor Prewitt, the records fail to reveal it For over 40 years he continually served the profession and the public with all his energy. Not even when his carriage drawn by the team of roan horses took him on his rounds did he rest his ever active mind. There were always several books and periodicals on the seat beside him in this vehicle He read the newer literature but did not neglect the textbooks with which he constantly refreshed his memory. Never was he unprepared when he entered the lecture room

The surgery of today is not the surgery of the past generation. Laboratory methods and newer developments of many kinds have brought about an un precedented progress. However it is to be regretted that there is throughout it all an evident neglect of that patient bedside study and wide range of medical knowledge which broadened the viewpoint and produced those misters whose memory is so dear to us. Any list of these pioneers will be incomplete without the name of T. P. Prewitt.

ROBERT I. SCHLUETTR

CORRESPONDENCE

THE DEFINERS OF THE SHIPPENT PLACENTS BY THE MOJON GABASTON MITHOD

T il Edit —Asa surgeon I ha e no experence of cases of adherent placetta but the technique d scribed by Dr. Julius Jarcho in Streets. Galax. COLOR AND OBSTFRICS of February 1928 of injecting saline solution into the vein of the umbild calcord by means of a roof syninge appears to mean capable of improvement. In the Pred tioner of Octobr 1938 I discrebed a method of intra-enous injection of fluids v high I have used repeatedly for 30 wars.

Bri fly thi method consists in the use of a blunt bulbous end of cannula attached by a length of rubb r tubing to an ordinary Higg noon enema syring the cannula being tied into the vein. The m thod is simple give the operator ab olute control of the amount and rat of inject on and appears to b adm rably suited to crises such as those de-

ribed by Dr Jarcho
C HA LTON WH EFORE MPCS LRCP
L H S h Pl m h1 fm ry

LICATURE OF THE ANGLIAR AREA A PR

LICATURE OF THE ANCLEAR VEIN AS A PRE VINTIVE MEASURE IN PACIAL CARBUNCLE

To the Patto—Ham Iton Bulley n hs article figature f the \(\) gular Vein as a I reventive Me sure n Tacial Ca bun le in the April 1928 numb of Surgery Ginecology and Obstetrics states

To forestall the spread of infect on by this route (angular vein) ligation of the angular vein ust be a sound proposition

L gatur of the a gular v in und r local anass thesia is a m asure which is e tirely fre from da ger and n ul led ilvd good

If in addit on to this s gn (suffusion of the eye lids) there is considerable elevation of temperature

th call fractio is i prat

LAMOUTH LAGLA O

"It ex not be conceded the I ligation of the angular via must be safe and the It is not fraught with langer I done under loc lanasities." There must be much trauma in working around the angular via under local anissthesia especially. I there is a great deal of peri orbital ordina. We have all a rined Irom said experience that it rums of any kind helps the spread of infection through superior light and the special purpose and the speci

vein has become invaded. Clinically we see pa tients with the picture presented by Dr Bail v suffusion of the eyelids and high temperature who have negative blood cultures repeatedly and who under conservative therapy get well without com plications In a recent communication in which Ray therapy surgery conservative treatment and circuminjection of autogenous blood in car huncles were evaluated I think that it was shown pretty conclusively how difficult it is to draw con clusions from any one type of therapy in carbuncles in which accessory therapeutic methods were allo employed These immediately introduced vari ble factors on one side of the equation. It was further shown how for instance one of these variable factors (conservative therapy) produced cure alone Dr Bailey reports only three cases In Case r death occurred despite the ligature of the angul t vein In Case 2 there is no proof of a blood infec t on or involvement of the angular vein bet figature of the angular vein is given the cred t for the cure whin accessory therapeutic measures (intravenous mercurochrome hot magnesium sul phate fomentations) were also used. In Case 1 th patient who had a positi e staphylococcus blood culture had a lig tion of the angular ve n and the injection of shole blood around the periphers of the carbancle 1th local applications of hot fomenta tions and intravenous administration of mercuro chrome The pat nt recovered How then can the result be attributed to ligation of the angular vein when there was so much addit onal therapy

s h ch in itself repeatedly produces cure?
This communication is not meant to decry the
use of ligation of the angular vein selected cas is
of carbuncle of the face but rather to warn against
the use of local anaesthesia for the p ocedure and to
be guarded in a dawing conclusions as to its r al
alue. Rectal is far preferable to local anaesth as to its r
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N a York N Y

ABDOMINAL FRUMITUS IN PERFORATION

T the Editor — Rece thy I in ted in a patient with a perforated duod. I there is symptom in the I critical in the I critical in the I make the I

had never seen before and have never read of This patient had been sent into the hospital from about 15 miles in the country. He was a man 37 years old whose past history was negative everet for some indefinite indigestion several years before About 6 hours before I saw him he had suddenly developed terrific pain in the abdomen just to the right of the umbilicus, and had sent for his family physician who had been obliged to give him three hypodermic injections of one quarter grain of morphine each. The pain had not been a sociated with omitting or uninary disturbines.

When seen by me he was quite comfortable His temperature was 98 degrees pulse 80 and respiration 24 Leucocyte count was 16 300 with 90 per cent polymorphonuclear neutrophiles Urinalysis was negative except for a faint trace of albumin and an occasional hyaline and granular cast. His abdomen was somewhat tender and slightly resistant all over There was no localized tenderness or rigidity at any point However when the hand was placed on the right upper quadrant a coarse fremitus could be felt -similar to the vocal fremitus felt over the thorax -- but coarser and stronger This was in dependent of breathing talking or moving It gradually became weaker and finally disappeared as the palpating hand was moved away from the right upper guadrant

I believed that this fromtus could only be due to fluid or gas e ciping from a hollow viscus and mad a diagnosis of perforated peptic ulcer and urged immediate operation although the patient dol not appear very sick and other than the fremitus there was very little to substantiate the diagnosis. The large amount of morphise which the patient had received was undoubtedly masking his symptoms.

At operation a large duodenal ulcer with a very small perforation was found. As gas and fluid

spurted through the perforation the surrounding tissues were made to vibrate and this was responsible for the fremitus which had been present before operation

While abdominal fremitus in cases of perforation of hollow viscera must be rare if looked for it would probably prove to be present more frequently than might be expected. When present it would be pathognomomic of perforation and would prove most valuable in cases similar to mine whose other symptoms bave been obscured by large doses of morphine. John M. Lyons M.D.

WASHINGTON D C

AN UNUSUAL FAT 11 OPTRATIVE WOUND INFIC TION YIELDING A PATHOGRING AN LEROBE OF FIRE (AS GANGRENE GROUP WITH DIFICT REFERENCE TO CATGUT AS A SOURCE

Totle Editor — Since the publication of our paper in the December 1921 number of Stracks Gentrodic or and Obstetrics describing what we thought to be a new pathogenic anaerobe we have found that Dr A Spotchelin Buenos Arres previou by de cribed an organism in 1922 similar to ours. Hall in the November 1921 number of Journal of Infectious Diseases suggested that these organisms might be similar. We obtained Sordellis strains from Hall and have determined by reciprocal serological tests that they are the same? We vield therefore to Dr Sordelli the priority of discovery and acknowledge bacillus Sordelli and C. ordematoides to be one and the same species.

FRANF L MELENFY M D
FREDRICK B HUMPHREYS M D
LOUIS CARP M D

New York

The dity of it demondered dealth in its illustration of the company of kLM leaves So Ep Bi& Med 98 xx 6 64

THE SURGEON'S LIBRARY

OLD MASTERPIECES IN SURGERY

B ILFRED BLOWN UP FICS ON HA

THE MEDICO SURCICAL OBSERVATIONS OF JOBE A METALLIA

THES t enth-centur has produced the stand and as in of a atomy as a sence and thus furnished a base upon he he he practice of surgers was to be founded. Can gue it anatomy had withdrawn a little from surger soft as publication by the lican as copied in a deligible to the septimental part of hiss ince to the seb it fett die carry stonespie illy as far and his contemporaries had risted the surge of to a positio of primiles in the production of the second the service of the second the service of the second that the second the

At the b ginning of the set in the atturn surgeons were I olong f other mithod t e press themsel es. If then to the alphant of the cetter as to bring forward is siden of the cell to in but thus a star too adv in dear the gill to in but thus a star too adv in dear the gill and upph a sing in haracter to appeal the rank in fife of the profession a dit as to be in a late citur that John [funter vast e cive h si, so the fin damental pathology of inflammatory and tions which er to the size one soon them in to think about

go the surg ons som th ng n to think about laced the hs c ndition I affair the inse r was apparently found in the fat that the ame the fashion to t jubish beeks contit g in the r ta hing of long! I st of 1 kel cas s—mans of the mother and prelate to n anothe—and it that and f nit disctions d awn fom the mother than 2 that and f nit disctions d awn fom the mother lader truing standpoint r ta ling the oil soft has perfectly a standard shift in sand may all u the bit ter—and calling particular attento the great skill and abit to often authorism the had go the condition especially if several other had fall disclore he was called

The vark of Joba Meek reno Jac Me k na Dut h Heelmeester or geon and natomst of Amste dam Holland 1 ho d d m 1066 s a 1 spead cample of the Obs 1 at 0 s or C s 1 a of the seventeenth century. The vork uppar mily appeared first written in Flemsh for the 1tl page 1 d Th Med co 5 g cal Obs 1 atton of Job a

Meek r n Surgeon of Amsterdam t anslated from

the Belgian into Latin by Abraham Blasius so of Gerrid student of Medicine Amsterdam from the workshop of Henr cus and the wido of The Joins Bom 168 Abraham Blasius dedicates his triation to his father Gerard v ho was an anatomist and annotat d th work of Vesling. For a time he pos d as the discovers of the parot d duet until St. non in a litter to Barth lin dipro ed h

M kr n in his preface states b lief that ad ance in surgery ill best be gained b adding fact to fact until as he spress sit. If each on of us adds on grain of sand to the complement of the il lustrious and noble Art of Viedic ne soon impresses t cas res and a unerable gifts will be brought t g th r to fill the a ed of ours kes ur fellow ct z s and our posternts to eure disease sur

M ek ren pr ceed to h s task after the usual m ner f the time beg ming with fr ctures of the sl. Il a denling the m tratise ith surgical diseases f the lo r vir m to The translator h d added som posthum us ob ervat ns divided int chapt s th first of hich dals ath monsters mong thich o ot s b th possibl anomalies and s me i hen m t be pleed in the ealm of the vionary. The till p ge gi sa far dea f th tip of ease hich s Hustrat d and descr b d in th bods of the no k The r bb rsk ed man vas vy u g Sp n ard aged 3 that Me k n s in cons ltation th se eral ph cans in this dam He offer no viplanatio of the abno mainty. The third pat throm the right standing at the toler is young lady sho had hat Melin de ribe as a cartilaginou nas l noly n wh ch h moved through the mouth and the nasoph runx other ultageue O emu teons de

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thr ugh at the st. he quot's authorities going beken Hippocrat sur some in ta sa din oft is fe ng to lis contemporares 0 e l sthe book at hit leel ng that Meek rah s dded far mir than his one gaa of sand to the compleme to fithe illustrous and n ble A t f Medicie





REVIEWS OF NEW BOOKS

THE idea of Crowel to combine under the same cover the subjects of bacteriology and urgers of chronic arthritis is unique and commendable. In view of the stress of tremendous specialization of the present day when bacteriologi to read in I delve further into bacteriology only and surgeons re trict their studies to problems es entially surgi il thi excellent work will make the surgeon real lac teriology and the bacteriologist acquaint him If with problems of a surgical kind. Closer union through more common interest and prolonging of co operation over a period of time between urgein and bacteriologist undeniably promotes int lligent treatment surgically of the chronic arthriti

The book gives a composite classification (farthri tis with a comprehensive discussion and profus reference to the literature. The chapter on arthritiets forth the pre ent day views of many writer on the subject together with the classification of arthritis In addition it gives the author opinion

that both staphylococcus and streptococcus ar the etiologic factors in the production of arthriti

It seems to me to be unfortunate that the section written by Dr Price on dental infection ha been allotted so much space as it tends to convey the impression that his opinion is far more important than is generally credited by his confreres in oral surgery

It is the reviewer's impression that in the chapter on surgery the discussion of surgical technique will be of little value to the surgeon The bacteriological discussion should however be of great value in affecting surgical judgment as to operative indica

Essentially this book is an endeavor to clear up the hazy ideas of the streptococcus and to give us a new classification While the author's method will not be the last word it will serve as a stepping stone for other bacteriologists to carry on blazing new trails in our present jungle of facts and ideas on this subject The work of compiling this book represents the laborious assembling of hitherto scattered in formation The comprehensiveness and the sim plicity of style of this book make it very readable The author should be commended for his sincere purpose of searching for truth

One of the most worthwhile results of a work such as this is to focus attention on the necessity for closer contact between the surgeon and the bacteriologist with the purpose of having the bacteriologist render an opinion which is much more personal and cogni zant of the case in hand than is the present im personal academic decision not referable to any particular individual

The book is of little value from the point of view of surgical technique but does serve to revise and bring up to date a surgical concept of the rôle of strepto coecus in arthritis and bone and joint surgery

LAURENCE H MAYERS

THIS atlas by Bertwistle and Shenton' is an ex cellent graphic exposition of the subject of typical \ ray examples of normal and abnormal k sions The atlas method commends itself in \ ray works that are intended as reference books as well as material for teaching roentgenological inter pretation

The authors have presented a very wide range of the practical application of the \ ray in diagnostic studies The illustrations are of a high order each one is accompanied by a systematic analysis which ad I greatly to the value of cases presented

This combination of the clinical with the \ ray features is illustrative of what should be more gen erally practiced by the referring physician and the roentgenologist The closer co operation of clinician and laboratorian will result in a better understanding of the more minute details of the patient's condition and will give the best possible results. The book is divided into anatomical systems each of which is adequately covered by splendid illustrations and explanatory text The authors show among other applications of the \ ray in diagnosis the use of lipiodol in lesions of the nervous system but do not include the important injection of this material in the respiratory tract which is now being u ed with increasing frequency by American roentgenologists and thoracic surgeons EDWARD & BLUNE

THIS eighth editions of the synopsis of urgery has little over two page more than the seventh The e are utilized in an excellent discussion of poliomyelitis Further changes are -a revi ion of the chapter on hydrocephalus which is improved by a classification according to etiology and men tion of the Graham Cole method of choleeystog raphy Save the changes here mentioned the text is identical with the previous edition

SAM FOGELSON

THE eighth edition of Disgnostic Character is represented by a large volume of 1 31 pages. It has undergone considerable change since its first appearance in 1895 The work is characterized by considerable did actic skill the diagnosis of various surgical conditions is treated in the completest

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B CTE LOG DSUR CH A TH TI DRIN WESS WITE D-REUL TEAM T By II WIT C DM B Ch (D) MRCS IR (P Th Ch pt S g I T tm t by II be t F king CBE MRCS (Lg)

pos ible fashion Characteristic of French works on surgical diagnosis the field f genecology: like wise included. The book is illustrated by numerous well selected and instructive pictur grams ho vever are of a er infer or quality

GE R II TERIN

IN a valuable and interesting monograph I auchet analyze his experienc, ith the surgical treat ment of gastric cancer. The text is illustrat I be exc lient pictures of the uccessive stig of the operation of gastric resection. In fact, this appear to be the more aluab e part of the mon graph So for a the technique of the oner tion 1 c n red a special emphasis a laid up n the ten of the great omentum along with the stoma h s as to r mo e p s ble lymph m ta ta s Lau het p of rs an anterio gastro ente o t my y th the littion of Banlabulay entr tro tomy lie is an nthusiastic advocat of the explorat s lapar t ms His i di ati n f tes cti n are boal In hi op rativ material th m t lits am u t d to 7 per cent wh reas n the numbe feu ba elup n a 5 v arl mit it vas 3 3 p rc ta e em i k ble re ult. The monogr ph 1 compl t I by an instructis h stopath log cal study b Hr hberg

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Sug s to the teacher a Ife ni

Ame sean surg ns-Via o Vib Tuld an I Bloodgood-s at contribut on England and I rance contributed important articles. Of the many exeell nt Italian authors on ca nl select a few for sp cial mention O Mangan ci has an excellent paper on retrope iton l ech n co c exsts and ther teatment luttivet in the aris cure of congenital luxations of the hip U Archang here the subject of osteomalaeia Artom d Sant Agn se ad entes the transic ical and trans vesicop iton l route f r th r pa of ob timite vesicovag nal fetulæ repo ti g g c s s of which 6 vere successful R Falcon contr butes a new m thod for the cu e of hyp spadia using the serotum for the fo mation of a doubl p dieled new canal He first sutu es the new can I with the kin outside waits 4 to 5 weeks for the creulat on to be re established and stimulates proximal ci culation in the new canal by apply ng intermittent elastic con striction on its distal end. The final step in his operat n cons sts in se e i g the distal end of the canal splitting it long tudinally ith sc sors and resuturing it with the skin nside. The lo mation of the pen le canal and a cho ing of the new tube are carried out according to classical linrepo ts successful cases

C KE E MA B I t P h dAH bbeg F G D C S A CED I LL C D M B t Dolgn L C Pr H 7

G Egidi reports to cases of umb lical hernia n r minently cured through the use of pedunculated strips of r ctus fascia which he criss cros es over the umbilical opening through two stab wounds in the rectus fascia In this vork he vas inspired by L. I. Me Arthur's work on autoplast c sutures published GEO CE DE TARNORSIV

EMERSON S recently published textbook on physical d agnosis is in contrast to many of the mo er cent works on physical d agno is a le su dy painstaking and detailed discuss on It represe to the point of view that in spite of the enormous ad vances in scientific medicine in the laboratory and at the bed side physical diagnosis by the eve and hand still remains the ba s of correct medic e Fully one thi d of the vork may be said to b de voted to the results of inspect on -that is g eral physical characteristics sl. n diseases and signs of phenom na to be seen in different parts of the body This is as it should be since inspection is the most neglected and pe haps the most valuable fo m of physical examination. One might question the use of 75 pages de oted to the de cription of skin lesions

as being out of place in such a work

I broad foundation for the st dent is laid by the ntroduction of many subjects not strictly a pa t of manual diagnosis such a a history of physical diagnosis and a d cussion of types of growth obe to posture fiver and blood pressure. The character of the ntre ork a thorough and d tailed The p inted page s sp inkled ith plata s and headings i bold type The classical sg so of various lu g find ngs a p sented with m y diag ams. The section on heart as well as the rest of the 1 orl 18 well illustrated The discus ion is c mplete fo insta ee th technique for taking and observations in the charact ristic of the pulse are di cu sed for 6 clos ly filled pag clude a d cus on f puls arrbythm as frequent nte est ng and sound though not convention I op nio s tre pr s ed for instance. It is not tru that thicken g of the ess l alls s an almost phy plogreal pro ess a t uly normal man ni ety should base a soft arte ies as one of thi ty the presente of r spiratory va a v rs of age t on of the pul would indicate a so d rath t than n i jured heart a dem nstrable enlargem t of the heat is 1 as due to c diac d latation an e treme hype trophy alone ould incease the cardiae shado scarcely ne c nt meter There is some question as to h this book should

be used Cert inly according to my experience a a student and judging by the knowl dge of inte es and students of the present phy cal d gn not receiving the att ation hich it should If this b ok is to b u ed by students f r more time should be spent in d dactic teaching I physical diag osis and with such a work it could will be made o e f the major subjects of the clinical v a s of med cal

Ps DtA is By Ch les Phill Em so AE MD Phild lph d Le d J B L pp . 3

school It does not seem that the work is quite ex tensive enough to be used as a final reference work although apparently every phenomenon is at least mentioned It is a book which should certainly be considered by any one interested in teaching or studying physical diagnosis PAUL STARR

KERS valuable manual on acute contagious diseases has appeared in its third edition since 1011 It is composed of a rather discursive introduc tion and a chapter of advice on the observation of rashes and throats and then successive brief clear descriptions of measles rubella scarlet fever small pox vaccinia chicken pox typhus fever enteric fever diphtheria erysipelas whooping cough mumps and cerebrospinal meningitis. A photo

graph of the rash or distinctive lesion in each of these conditions is reproduced

This manual has been brought up to date by Dr Rundle and includes a description of the more recent immunological advances in the treatment of these fevers He is possibly not as enthusiastic concerning active immunity as prophylaxis in diph theria as our American writers but nevertheless admits its success. He is still more conservative in regard to the specific antiserum in the treatment of scarlet fever which to us seems to be eminently suc cessful Likewise in the treatment of erysipelas he rather discourages the u c of an antiserum although recent American experience indicates that very successful results may be obtained with a new

Except for such differences of opinion the book is a very valuable description of these common diseases and should continue to be of use to students and PAUL STARR practitioners

BOOKS RECEIVED

Books received are acknowledged in this d partment an I such acknowledgment must be regarded as a sufficient return for the courtesy of the sender Sel ctions will be made for review in the inter sts of our readers and as

space permits
DIE TECHNIK DES ORTHOPAEDISCHEN EINGRIFFS FINE OPERATIONSLEHRE AUS DEM GESAMTGEBIET DER ORTHO PAEDIE By Dr Philipp J Erlacher Vienna Julius

Sprin er 1928

THE MATERIAL AND METHODS OF THE GYN ECOLOGICAL AND OBSTETRICAL DEPARTMENT IN THE UNIVERSITY OF LIVERPOOL By W Blair Bell BS MD (Lond) Hon TACS Manchester Sherratt & Hughes 1928

BIOLOGIE UND LATHOLOGIE DES WEIBFS EIN HAND BUCH DER FRAUENHEILRUNDE UND GEBURTSHILFP By Josef Halban and Ludy to Settz Lieferung 43 Berlin and Vienna Urban & Schwarzenberg 1928
LES TUMEURS VILLEUSES DE RECTUM
Lambling Paris Masson & Cle 1928 By Andre

DIATHERMY ITS PRODUCTION AND USES IN MEDICINE

AND SURGERY By Elkin P Cumberbatch M A B M AND SURGERY BY EIGHT P CUMBETGATER U. 5 DAYS

(OXON) D WR E (CAMB) MR CP 2d ed St Louis

The C1 Vlosby Co. 1928

V HANDBOOK OF CLINICUL GYSFEOLOGY AND OB
STEPRICS BY Rae Thornton La Vake VB VB VB

FACS St Louis The C V Mosby Company 198

THE DUODENUM VEDICAL RADIOLOGIC AND SURGERA

STRIPE BY DESTER DAYS LOW COMPANY 198

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STUDIES By Pierre Duval Jean Cha les I ouv and Henre Béclère Translate i by L. P. Quain M.D. St. Louis The C. V. Mosby Company, 1928

OPERATIVE SURGERY By J Shelton Horsley M D FACS 3ded St Louis The C V Mosby Company

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION Ed ted by Mrs M II Mellish and H Burton Logie M D Vol n 1927 Published May 1928 Philadelphia and London W B S unders Com pany 1928

SURGICAL PAPERS By Will am Stewart Hal ted Vols and it Baltimore The Johns Hopkins Press 1924 CLINICAL MEDICINE By O car W Bethea M D Ph G FCS FACP Phil delphia a d London W B Saunders Company 1928

A MANUAL OF SURCICAL ANATOMY By Charles R Whittaker I'RCS(I'din) I'RSE 4thed rev and en larged New York William Wood & Company 198 INNUAL REPRINT OF THE PEPORTS OF THE COUNCIL ON

PHAR IACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 10 7 WITH THE COMMENTS THAT HAVE AIPEARED IN THE JOURNAL Chicago American Medical 1 ociation 1928

YEN AND NONOFFICIAL REMEDIES 19 8 Containing Descriptions of the Articles Which Stand Accepted by the Council on Pharmacy and Chemistry of the American Med ical As ociation on January 1 1928 Chicago American Medical Association 1928 NURSES PATIFATS AND POCKETBOOKS Report of a

Study of the Conomics of Nursing Conducted by the Committee on the Grading of Nursing School Vlay Committee on the Grading of Nursing School Ayres Burgess Director New York Committee on the Grading of Sursing Schools 1928

THE NOSE THROAT AND FAR By John F Barnhill MD FACS New York and London D Appleton and Company to 8
THE EYE C W Rutherford M D FACS New York

and London D Apr leton and Company 19 8

INTERNATIONAL CLINICS A QUARTERLY OF ILLUSTRATED CLINICAL LECTURES AND ESPECIALLY PREPARED ORIGINAL ARTICLES ON TREATMENT MEDICINE SURGERY ETC Edited by Henry W Cattell A M M D with the collab oration of others Vol 11 38th series 1928 Philadelphia and London J B Lippincott Company 1928
ADDRESSES ON SURGICAL SUDJECTS By Sir Berkeley

Movnihan Bart Philadelphia and I ondon Saunders Company 1928

GYNECOLOGY By William I Grayes AB MD FACS 4th ed thoroughly rev Philadelphia and

London W B Saunder Company 1928
WITHOUS ND PROBLEMS OF MEDICAL EDUCATION

oth Series New Yo k The Rockefeller Foundation 1928 BEITRAEGE ZUR KENNTVIS DER BECKENBRUECHE UND BECKENLUNATIONEN KLINISCH ROENTGENOLOGISCHE UN TI RSUCHUNGEN UEBFR DIE ANATOMIE DEN ENTSTEHUNGS MECHANISMUS DIE KOMPLIKATIONEN DIE BEHANDLUNG UND DIE PROGNOSE By Anders Westerborn Uppsala Mmqvist & Wiksells 1928

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

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FRANKLIN II MARTIN Chica o Di ector Ge r l

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WILLIAM C QUINEY CHARLES L SCIDDER JOSEPH L STANTON A WARREN STEARN JA 163 S STONE LORING T SWAIM HAROLD WALLER WAMA WHITTEMORE HANS ZINSSER

PLANS FOR THE 1928 CLINICAL CONGRESS IN BOSTON

FOR the eighteenth annual Clinical Congress of the American College of Surgeons to be held in Boston Oct ber 5th to 12th the clinicians of that city are keenly interested to present a pro_rin that will completely represent the clinical activities of that great in chick center in all departments of surgery. The program is being, preprind under the direction of a representative group of clinicians with Dr. Fin lenc J. Cotton as Chairman of the Committee.

In the following pages: presente la preliminary interain of clinics and demonstrations. These schedules are to be rea; ed and amplified during the next two months. The real program of the Congress will be issued daily during the Con reas—each afternoon there will be posted at head quarters in the form of bulletins a complete and accurate schedule of the clinics and demonstrations for the succeeding day. A printed pro ram will be issued each morning. Clinics vill be given in the various hospitals beginning at o clock on Vlonday afternoon and will continue throw hith mornings and afternoons of the following four days.

General headquarters for the Congress will be established at the Statler Hotal where the ball room fover and other large rooms on the mezza nine floor have been reserved for use by the Congress for registration and ticket bureaus bulletin boards technical exhibits executive.

offices etc The tallroom at the Copley Plaza Hotel will be utilized for hospital conferences evening meeting and other large athering

A special feature of the program which will be of interest to all surgeons will be the celebration of Liber Day at the Massachusetts General Hosq ital on Friday. At the exercises to be held in the Dome Room in the old building of the hospital where ether was first administered for the production of surgical amesthesia on October 16 1846 there will be pre-ented to the hospital a bronze bust of William T. G. Morton.

Since the last ses ion of the Clinical Congress a number of surgical films produced under the supervision of and approved by the American Colle e of Surgeons have been completed and will be liven a promier showing at the Boston meeting

EVENING MEETINGS

There will be exening sessions or each of the five days. On Monday evening the I residential Meeting will be held in Symphony Hall on which the Mattind Chaco will be inau unated and deliver the annual address. The Murphy Oration on Surgery will be de nered on the same e earing by Protessor Vittonio Patti Protes or of Orthop debugger, in the University of Bologona Italy and Director of the Rizzoli Institute. On Tuesday Wednesday and Thursday evenin a sessions will

be held in the bullroom of the Copley Plaza Hotel At the Wednesday evening meeting the visiting surgeons will be the guests of the Boston Surgical Society at a special meeting when the Bigelow Medal is to be awarded. On Friday evening the annual convection of the College will be held in Symphony Hall when the 1928 class of candidates for Fellowship in the College will be received The fellowship address will be delivered by Dr. William J. Mayo.

ROSPITAL CONFERENCE

An interesting series of papers round table con ferences and practical demonstrations that deal with many of the problems related to hospital efficiency is being prepared for the annual hospital conference which opens on Monday morning with a session in the bullroom of the Copley Haza Hotel Morning and afternoon sessions in the same room are planned for Tuesday Wednesday and Thursday

A special session of the hospital conference on Wednesday afternoon will be devoted to a symposium dealing with the standardization of the ophthalmological and otolaryngological de

partments in general hospitals

The program for the conference is planned to interest not only surgeons but also hospital trustees executives and personnid generally and an invitation is extended to all persons who are interested in hospital activities to attend the conference

REDUCED RAILWAY FARES

The rullways of the United States and Canada have authorized reduced fares on account of the Boston session of the Clinical Congress so that the total fare for the round trap will be one and one half the ordinary first class one way fare. To take advantage of the reduced rates it is necessary to pay the full one way fare to Boston procuring from the ticket agent when purchasing ticket a convention certificate which certificate is to be deposited at headquarters for the vist of a special agent of the railways. Upon presentation of a visced certificate to the ticket agent in Boston not later than October 16th a ticket for the return journey by the same route as traveled to Boston may be purchased at one half the regular one way fare

In the eastern central and southern states and eastern provinces of Canada tickets may be pur chased between October 4th and 10th in south western and western states between October 3d and 9th and in the far western states and western provinces of Canada between September 30th

and October 6th The return journey from Boston must be begun not later than October 16th

The reduction in fares does not apply to Pull man fares not to excess farts charged for passage on certain trains. Local railroad ticket agents will supply detailed information with regard to rates routes etc. Stop overs on both the going and return journeys may be had within certain limits.

Tull fare must be paid from starting point to Boston and it is essential that a convention certificate be obtained from the agent from whom the ticket is purchased. These certificates are to be signed by the general manager of the Clinical Congress and vis ed by a special railroad agent in Boston during the meeting. No reduction in rullroad fares can be secured eveept in compliance with the regulations outlined and within the dates specified. It is important to note that the return ring must be made by the same route as that used to Boston and that the certificate must be presented during the meeting and return ticket purchased and used not later than Ortober roth.

An exception to the above arrangement is to be noted in the case of persons triveling from points in the Pacific Coast states and British Columbia who will be able to purchase round trip summer eveursion tickets which will be on sale up to and including September 30th with a final return limit of October 31st. The summer excursion fare is somewhat lower than the convention fare men tioned above but is available only in the Lucific Coast states and British Columbia. Tickets sold at summer excursion rates permit traveling to Boston via one direct route and returning via another direct route with liberal stop over privileges.

LIMITED ATTENDANCE-ADVANCE REGISTRATION

Attendance at the Boston session will be limited to a number that can be comfortably teconimo dated at the clinics the limit of attendance being based upon the result of a survey of the amplitheaters operating rooms and laboratories in the hospitals and medical schools as to their capacity for accommodating visitors. Under this plain it will be necessary for those who wish to attend to register in advance.

Attendance at clinics and demonstrations will be controlled by means of special clinic tickets which plan has proved an efficient means of providing for the distribution of visiting surgeons among the several clinics and insures against over crowding the number of tickets issued for any clinic being limited to the capacity of the room assured to that clinic.

REGISTRATION FEE

A registration fee of \$500 is required of each surgeon attending the annual Clinical Congress such fee previding the funds with which to meet the expenses of the meeting. To each surgeon registering in advince a formal receipt for the registration fee is issued which receipt is to be exchanged for a general admission card upon his registration at headquarters during the meeting. This card which is nontransfer blue must be presented to secure clinic tickets and admission to the evening meetings.

BOSTON HOTELS AND THEIR RATES

Since the last Chinical Con, ress in Roston in 1922 a number of new hotels have been built including the Statler with 1300 guest rooms the New Parker and the Ritz Carlion. Some of the older hotels have been enlarged so that there are now ample first class hotel accommodations in Boston for all who wish to attend. Many of these hotels are located within short walking distance of the headquarters hotels.

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PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY GYNECOLOGY OBSTETRICS UROLOGY ORTHOPEDICS

infections

department

PETER BENT BRIGHAM HOSPITAL

Wonday

HARVEY CUSHING-2 30 Neuro urgical climic FRANCIS NEWTON-3 30 Diverticulitis CHANNE TROTHINGHAM-4 Passing of the chronic ap

pendix
S TMERY JR -4 30 Study of the results of medical and surrical treatment of peptic ulcer

Tuesday

Staff—9 30 Surgical operations
H A CHRISTIAN—2 30 Medical diagno tic and thera peutic clinic

GILBERT HORRAY—3 30 Cordotomy for the relief of pain J P O HARE—4 Hypertension and nephritis in elation to surgery

DAVID CHETVER-4 30 Surgical diagnostic clinic

11 cdnesdav

Staff—0 30 Surgical operations
M P Sosman— 30 \ ray study of massive itelecta is

of the lung G P GRABFIELD-3 Effect of drugs on the nitrogen metabolism

JOHN HOMANS—3 30 Treatment of varicose ulcer S A Levine—4 Heart disease in surgery S B Wolbacii—4 30 Demonstration in surgical pathol

Tl ursday

Staff—0 30 Surgical operations
W C QUINBY—2 30 Surgical clinic
R H Firz—3 Insulin in surgical conditions WILLIAM MURPHY and JOHN POWERS-3 30 Tr atment of secondary anæmia by liver di t

HARVEY CLERING and TRACY PUTNAM-4 Pituitary gland and its influence on growth

MASSACHUSETTS GENERAL HOSPITAL

Monday Orthopedic service—2 Dry clinics
NATHANIEL ALLI ON Tuberculosis of the knee

P D Wilson Tuberculo is of the spine DR M N SMITH PETERSON Tuberculo is of sacro iliac R K GHORMLEY Internal derangement of knee joint NATHAMEL ALLISON and DR KLEIN Concenital di location of hip

Su gical service—2 Dry clinics
J H Means E P Richardson and George Holmes

The thyroid GEORGE McIVER Burns

DRS WHITE and SPRAGUE The beart in surgery

C M JONES The gall bladder J H MEANS Surgical cases

Tuesday

J D BARNEY and staff—9 Genito urinary operations Surgical service—11 Surgical operations D I JONES—2 Dry cl mic Cancer of gastro intestinal tract

C \ PORTER-2 \ ray burns

W | MIXTER | B AVER and | S HODGSON- Surgery of the nervous system operations and demonstrations \ Meics-2 Uterine bleeding etc

L S Mckittrick—2 Radium in cancer of the rectum Arthur Alley and R H Shithwick—2 Circulatory di ea es of the extremities po toperative pulmonary

Wednesday

DRS WIMAN WHITTEMORE CHURCHILL and LORD-0 Thoracic surgery operations

R C Canor and Miss Cannon- Social service DR BREWSTER-2 Surgical clinic DR LLOYD and associates-2 Syphilis and surgers

A WASHBURN-2 Early days of the Wassachusetts General Hospital first ether anæsthesia

DR Smyons- Surgical cases WILLIAM HERMAN—2 Psychiatry and surgery
DR HOLMES and associates— Demonstration in \ ray

Tlursday

Orthopedic service-o Operations and demonstration of

DRS WILSON and DANFORTH Arthritis of spine
NATHABITE ALLISON and DR COONSE Arthritis of knee
WILLIAM ROGERS and DR STRAUMER Arthritis of hip
R K GHORMLEY and DR LOW Pollomyelitis

WILLIAM ROCERS End result studies

Fracture ser ICe—2 Demon tration of cases
DRS VINCENT and A V BOCK—2 Dry clinic The spleen

E P RICHARDSON- Hernia through cardiac orifice of diaphragm LINCOLN DAVIS-2 Cancer of cocum duodenum and gall

bladder DR HANFORD (Presbyterian Hospital New York) and RICH VRD MILLER-2 Clinic on surgical tuberculosis

DR DALEND-2 Climic on plastic surgery DR SHEDDEN-2 Surgical clinic

$\Gamma nday$

Staff-o Surmical operations

G \ LELAND-12 Fascia repair of hernia DRS C A PORTER BREWSTER JONES DAVIS RICHARD SON and WILLIAMS-IT Surgical clinic R B GREENOUGH and associates-2 Tumor clinic

DR McIlver— Gastro intestinal surgery
DR WILLIAMS—2 Gall bladder surgery
DR AUB—2 Clinic on occupational diseases calcium roetabolism in bone

A V Bock-2 Surgical clinic DR HARMER-2 Surgical clinic

CAMBRIDGE HOSPITAL

Ti esdas

Staff-q General surgical clinics operations and demonstration of cases

Wed : sday J W SEVER and F A FINDLAY-9 Orthopedic clinic operations and demonstrat on of cases

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Staff-9 Gen ral surgical clin cs operations and demon stration of cases

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BOSTON CITY HOSHITAL

Monday

N R MASON R M GREEN C T WILLIAMS T L GOOD J P COHEN H V HYDE and I J LYNCH-Gynecological and obstetrical clinic operations and demonstration of cases

Tuesday

H BINNEY A R KIMPTON HI H HOWARD C W PAPEN D D SCANNELL S TRASER J J HEPBARN and T W WICKHAM-9 Surgical climic operations and d mon stration of cases

Surrical Services I and III-2 Dry clinic W WHITE-2 Intussusception of the bow loc urring

- within the stomach following gastro entero tomy G C SHATTLCK- Surgical aspects of some tropical maladies
 - II ed tesday

H B LODER J J WALKER I' F HENDERSON E HARDING J C HUBBARD R C COCHRANE D MINE 1 RILLY and T RICHARDS-9 Surgical clini opera tions and demor stration of ca cs

Surgical Services II and V—2 Dry clinic
G R Mixor and J T Wears—2 Dry clinic
W R Offer—2 The care of the surgical diabetic

F B MALLORY - Pathological demonstration

Tlursday

F J COTTON O J HERMAN J H SHORTALL and W Norrison-9 Surgical clinic of erations and d mon stration of cases

D MUNRO and TRACY PUTNAM-Q N urosurg cal oper

Surgical Service IV -2 Dry clinic Neurosurgical cases

S COBB and \ Myersov—2 Neurological clinic B Butler—2 \ ray d monstration

Friday

F B MALLORY I F BUTLER I J COTTON R W ANDREWS and others- Conferences and presenta tion of special subjects

CARNI Y HOSPITAL

Monday

A R MacAusiann—2 Dry clinic Traumatic injuries of the bip joint illustrated
II G Let—2 Dry clinic Fractures of the femoral slaft

and of the table of tibia wri t joint arthroplasties D F MAHONEY-2 Dry clinic I adical operations for carcinoma of the I reast and perforating duodenal ulcer with presentation of cases

Tiesd y

- I' B I UND A Mck Traser and associates-9 Surgical operations
- I' W Jourson L E Phaneur and as ociates-- Gyne
- cological and obstetr cal operations

 L Bri rr—2 Dry clin c Ununit d fracture of neck of
- femur bon ser ws in fractures fusion of pine Γ B LUND L J DEN ING and W L BROWNF-2 Dry
- clinic Chronic duodenal ulce I'W Jourson- Dry clinic End results lollowing in terpo ition operation for uterine r olapse (lantern slides)

Il ed sday

D F MAHONEY W E BROWNE and associates-9 Cener I su gical operations

T W IDHASON L W PHAMI UP an lassociates-o Gyne cological and obstetrical operations

P \ Inpso -2 Dry clinic R lativ value of various types of operative bone splinting including the mas sive bone graft treatment of chronic arthritis of the spine operative and nonoperative incidence recog nition and treatment of pondylolisthesis over correct tion of deformities in fractur's

1 Mck IRASER-2 Dry clinic Carcostomy in acute

app ndicitis with peritonitis pre entation of case

L. C. PRINEUF-2 Dry clinic The low or cervical cae sarean section (lantern slides)

Thursday

T B LUND 1 Mck FRASFR and associates-o General surgic 1 operations

W John son L I Phaneur and associates-9 Gyne

cological an 1 obstetrical operations W R MACAUSLAND - Dry clinic Mobilization of the

knee and elbow M II BLOOMBERG-2 Dry clinic Scoliosis and club foot F J Dryning-2 Dry clinic Postoperative medical

problems pre-operative treatment in cardiac ases

L E PHYNFUF Dry clinic Uterine bleeding (lantern slides)

Friday

D F MAHONIY W E BROWNE and associates-o General surgical operations

I' W Jourson L E I haveur and as ociates-o Gyne cological and obstetrical operations

A SARGYNT and B A GODVIN-2 Orthopedic clinic

D J DENNING-2 Dry clinic Intestin I parasites in

immigrants F BROWNE-2 Dry clinic Fractures and injuries of the hand and forearm with presentation of special

L L PRINCUF-2 Dry clinic Appendicitis and preg nancy

MASS CHUSET'S HOMEOPATHIC HOSPITAL

Monday

T C CHANDLER and II J LEE—2 General surgical clinic Operations and demonstration of cases

Tuesday

C T HOWARD and C CRANE-9 Surgical operations C A MIGEN and C CRANE—9 Surgical operations
C WIGGN and S N VOSE—9 Urological operations
S W ELISWORTH—10 Y ray demonstration
S R MEAKER— Gynecolog cal clinic

J F BRIGGS and W K S THOMAS-2 General surgical operations Il ed esday

T E CHANDLER and C D HARVEY-Q Surgical opera

A G HOWARD S L MARNOY and L G HOWARD-Q Orthopedic operations

C T HOWARD and H J LEE- Surgical operations L I Jounson-2 Bronchoscopic clinic

Tl sday

J E BRIGGS and C CRA E→9 Surpical operations
S R MF NARE—TO Gynecological clime
S W FILSWORTH—TO \ \text{Tray demonstration}
C T HOWARD and W K S Phonas—2 Surgical opera

Friday

T E CHANDLER and C CRANF-9 Surgical operations J L BRIGGS and H J LEE-2 Surgical operations

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SURGERY OF THE EYE EAR NOSE AND THROAT

MASSACHUSETTS FAC AND EAR INTERMARY

Tresday Ophthalmology

Staff-o Operations and demon trations of ca s I M WHEELER Plastic surgery

G S DERBY Eye operations W H LOWELL Viu cles

J H WAITE Slit lamp demonstration
E B DUNPHY External di ea es
R C CHENEY P rimetry
H K MESSENGER Physiologic optics
P A CRENDLER Li ht sen e

I L TERRY Patholom

IDAE RIDGEWAY Sight saving class

Otolaryngology

PHILIP HAMMOND-9 Simple and radical mastoid opera tion

H A Barnes-9 Dry clinic Malimant di as sof the acc ssory sinuses exhibition of patient
H P CARLL-to Dr. clinic Wire gau e brain drain

paraffin basket for kin graft of radical ma toid cavity lantern slides of brain cases G H Tobes-it Dry clinic Lateral sinus thrombosis

the manometer test C B FAUNCE- Dry clinic Lipiodol injections in brain

abscess D C Smyth-3 Dry clinic Limidol injection in lung

II ednesd v

Otolary ngolory G H FOIRIER-0 Mosher Tota lachrymal ac operation A Sumona-to Tonsillectomy ca s dissecti n and nar

G H PORTER Studer technique
II P Cutill LaTorce technique
P F Metrizer Removal with cautery snare
A S MacMillan—11 Dry clinic Demonstration of

Ophthalmolom,

Staff—9 Operations and demonstrations of cases W B Lancaster Fye operations J B Year and G S Derny Nerve eye clinic Madde Carviel. O ular tuberculosis J H WATTE Gullstrand ophthalmo cope

accessory sinus and ma told \ rays

P A CHANDLER Perimetry

B Suins External di eases H K MESSENGER Physiolo e optics
P A CHANDLER Light sense
T L TERRY Pathology

IDA E RIDGEWAY Sight saving class

Th sday Otolaryngology

VII KAZANJIAN—9 Plastie operation
D C SMYTH—9 Dry clime Fluo oscope and removal of
metallic foreign bodies

H P Mosher-10 Dry el nic Exhibition of cesophageal in truments demonstration of fluoroscopic examina tion of the ce ph gus

1 S MACMILLAN -- 11 Dry clin c Lantern shi le demon stration of resophageal cases

DR KITBY-2 Demonstration of Bárany tests F F GARLAND-3 Dry clinic Infection of the submaril Iary gland

Ophthalmology

Staff-o Operations and demonstrations of eases T B HOLLOWAY Thyroid eye cases
A GREENWOOD Eye operations

S J BEACH Refraction with angular type W B LINCASTER Muscles
H B C RIEMER Friernal di cases

E B DUNPHS Lemmetry

H K MESSENGER Physiologic optics
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Ophthalmology

Staff-o Operations and demon trations of cases I II VERHOEFF The operations H B C RIEMIR Tear sac cases congenital acute hronic

Any Suith Social work H K MESSENGER Physiologic optics

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Otolaryngology

I II KAZANJIAN-O Dry clinic Corr ction of defor mities of the face and nose lant in slide demonstra

H P Mosher—to Dr. clinic Punch tracheotomy 1 S MacMilla Vray of thymus (lantern slides)

F E GARLAND-if Hi ton al exhibit of laryn, eal instru H P CMILL- Dry clinic I antern sl de demonstration

of er al sections of the ear D H WALLER-3 Dry clinic Lip rending and the deaf

MASSACHUSETTS HOMEOPATHIC HOSPITAL

Tuesday

W D ROWLAND- Tre clinic F W Corners and H L BARCOCK- 9 Aural clinic

Th sday

W D POWLAND-0 Eve clinic C SMITH C W BUSH E P JOHNSON P O PARPIS and W W WALKER-9 Nose and throat clinic

Fidin

W D POWLAND J C STERNBERG H M FMMONS and J J SKIRBALL-9 Eye clinic

BOSTON DISPENSARY

Tuesday H J INGLES-2 Beck Schenk snare method of tonsil lectomy

Wednesd v

JOSEPH J SKIRBALL-II Eye clin c demonstration of cases external di ea es per metry ophthalmological co-operat on with syphilis clin c

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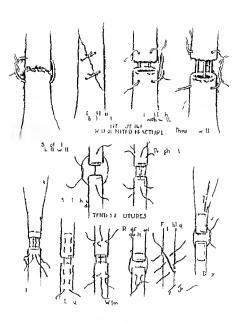
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Sutures with a Reputation

SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED MONTHLY

VOLUME \LVII

SEPTEMBER 1928

NUMBER 3

SPINAL CORD SURGERY1

BY ERNEST SACHS M.D. F.A.C.S. Sr. Louis Missouri

N an address before a general surgical society it would seem appropriate to dwell on the various types of spinal cord lesions that may be benefited by surgical intervention and to discuss operative results rather than to dwell on the points in diagnosis on which the neurological surgeon who does and ought to make his own neurological study has to spend much time and consider with meticulous care There will always be times when it will be necessary for the general sur geon to do a laminectomy although I believe that the general surgeon feels about this branch of surgery almost as he does about cramal surgery—he now gladly turns over this work to the neurosurgeon There is of course one great difference—the operation of laminec tomy is generally comparatively simple and one does not meet the technical difficulties with it that are encountered in a cranial operation The diagnosis however offers many pitfalls and it does not seem wise for a surgeon to be merely the hands which he must be if he has to depend on others for his diagnosis

INDICATIONS AND TREATMENT

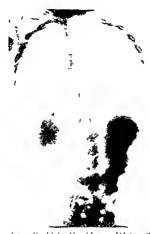
The conditions for which laminications may be required may be grouped under seven headings (1) fractures and dislocations of the spinal column (2) inflammatory processes meningitis and abscesses or solitary tubercles (3) compressions of the cord due to deformities (4) spasticities due to inflam

matory diseases cerebral birth palsies or old injunes (5) spinal tumors (6) relief of in tractable pain and (7) congenital defects (spina bifida)

The subject of fractures and dislocations with cord symptoms was discussed with some spenty before this organization several years ago when the subject was brought up by Dr Coleman. It is universally agreed that when no spinal cord symptoms are present such as spastic paraly sis sensory disturbances or bladder and rectal disturbances the problem is merely to deal with the fracture or dislocation by putting it at rest to institute supporting measures such as casts or braces and occ isionally to strengthen the back with a bone graft.

How about the cases however in which cord symptoms are present? These are of two kinds those that present the picture of a complete block of the cord with complete motor and sensory paralysis and those in which there is evidence that the cord is not completely blocked because the patients have some sensation below the level of the injury or some motor power even if it be only the movement of a toe. In either group the disturbance may be due to pressure which causes an interference with function but there is no anatomical severance or there may be a partial or complete severance of the cord.

Suture of the cord does not lead to regen eration and restoration of function and is a useless procedure A complete physiological



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block of the cord crannet be distinguished clinically from an anatomical everance the symptoms are identical—loss of all functions. If we want to see if the cord will recover some function as it may after a physiological block we lot e precious time and irreprable permainent injury may be done by the pressure alone. Consequently if these pritents are to get relief at all they must have an early exploration. We all dislike to operate un necessarily and have found the method suggested by Coleman some years ago of doing a spinal puncture and determining by jumples and provided the compression—the Queck-parkedit test—if

compression
is a block to be a
diagnosis. Il there is
should explore and do
block according to the
probably useless to op

the lesion is a pulpifying of the cord for which operation can do no good. That is the principle I have been following in the past 18 months but it is not improbable that that is too con ervative an attitude to take Since we Lnow that it is possible that the Quecken stedt test may not be positive in the presence of compression of the cord by a spinal tumor it seems perfectly logical to assume that the same thing may happen in the pre ence of a fracture - there may be compression of the cord and yet the Oueckenstedt be negative In such cases operation is indicated No. doubt the pendulum will swing back to a point where some of these cases will be operated upon If the picture of a partial block is present operation should be done only if there is evidence of compre sion of the cord 1 shown by the Queckenstedt test. Then too operation should be done early before secondary degenerative change occur

Abscesses of the cord or solitary tubercles present the picture of a focal spinal lesion and should be operated upon I want to record a unique case that we had years aro in an infant are o months. The lower extremities nere totally paralyzed and all reflexes abolished The legs of the child were an esthetic but on account of the age of the child the upper level could not be determined lipiodol injection showed a complete block (I ig 1) At operation a swollen cord was found and when it was incised a brown h mass the size of a peanut was readily enu cleated I thought that it was a dermoid but section showed it to be a solitary tubetcle The child made an excellent recovery at the time and learned to walk but 18 months later died of pulmonary tuberculosis

Memngitis due to a progenic organi m is such a hopele s desperate disease that any thing that may reduce the mortality which is close to too per cent i justifiable for that reison when we'see such cases early we drain the lumbar region at the site of the third or urth spinous processes. Phis operation was

recent years revived by Dr Wilham hton and certainly deserves a trial. In we have defined and there been 6 ref. That is a small per of rec. ut in view of the fact that it it had not been done probably all of the patients would have died it seems worth trying Dandy has advocated drainage of the cisterna magna in preference to that of the lumbar drainage. Where there is no spinal block between the cisterna and lumbar region I can see no advantage in draining at that point and with the marked retraction o frequently present in a case of meningitis the operation is technically more difficult and a more formidable procedure. If there is a local focus from which the meningitis originated that of course should be drained just as the appendiceal abscess must be drained if a spreading peritonitis is to be controlled. The two conditions however are not otherwise comparable for in the subarachnoid space there is a fluid which is being constantly secreted in large quantities while in the pentoneum the amount of fluid secreted is negligible. In favorable cases of meningitis which ultimately recover I have seen the drainage continue for 6 to 8 weeks Repeated spinal puncture does not accomplish the same thing for between punctures the reaccu mulating fluid tends to break up adhesion and spread over the cerebral cortex Several of my meningitis cases followed operations on the nasal sinuses by otolary ngologists but in such cases drainage of the local focus is quite impossible and of no avail. In not all the cases of meningitis have organisms been found but in such cases the diagnosis was made on the clinical picture and the high cell count in the spinal fluid varying from 600 cells up to thousands Of the cases which resulted in recoveries cultures showed the proteus vul garis in one the streptococcus in two and the staphylococcus aureus in one. The ques tion has been raised whether some of these cases in which organisms were not found might not have been sporadic cases of meningococcus meningitis. As all fluids were cultured and studied microscopically and as in no case intracellular diplococci were found we feel that this possibility can be excluded

Occasionally we see cases of cord compression due to spinal deformity (Figs. 3.4). I reported such a case before the American Orthopedic Association in 1925. In that paper



ligs 2 and 3. Spinal deformity v hich cau deord com pre ion. I hotograf h taken about 4 weeks after operation

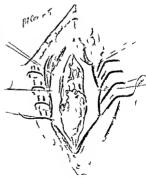
it was pointed out that similar cases had probably been mistaken for compression due to a tuberculous lesion Recently Mckenzie of Toronto has reported a similar case. In his case as in mine the rapidity with which the patient recovered after the compression was relieved was extraordinary. My patient had been totally paralyzed for 11 months and had been unable to move any muscles of his legs during all that time yet in 48 hours he began to move his legs and was walking 4 weeks after the operation Undoubtedly this condition is more common than would appear As a rule these cases are called tuberculosis and are not operated upon Tust what the pathological condition is is uncertain feel quite sure however that not the lipo matous mass overlying the cord (Fig. 4) but the gibbus over which the cord is stretched is responsible for the symptoms



Ample opportunity should be given a pa tient to recover under orthopedie measures from spinal cord compres ion in Lott's disease but if no improvement occurs after these methods have been given a fur trial operation may very properly Le considered lust how long the conservative methods should be tried is a matter about which there is eon iderable difference of opinion 1 ver on recently has advocated operating after 6 months if there has been no evidence of return of tunction. This seems a reasonable time to wait ithough ease are recorded in which recovery occurred after paraly is had been pre ent for a far longer time. When operation is performed the spinal dura should not be opened if there is any evidence as there u u ally is of an extradural proce on account of the danger of stirting up a tuberculous meningiti

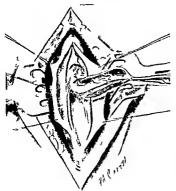
Spistic paraple, its without sensors disturbane's have received much attention from the neurological surgeon. It is beyond the scope of this paper to go into the ments of the various operative procedures that have been used to relieve spasticity since I im discussing only spinal surgery. The various procedures may be grouped under four headings (1) operations on the tendons (2) operations on the peripheral nerves (3) operations on the posterior roots—the Joerster operation (4) the Royle operation on the sympthetic Lych of the first three has its pluc in selected cases. The fourth the Royle operation is useless in the treatment of spasticity. The section and removal of the sympathetic does not affect muscle tone sufficiently if at all to be of any practical value since this praper is on pinal surgery. I shall speak only of the Poerster operation

The so called Foerster operation the cut ting of selected posterior roots intradurally changes a spastic leg to a flaccid one in a most remarkable and striking way. I have done the operation in about 30 cases but I have used it le s frequently in recent years. I have learned that in the first place the after treat ment mi ige and re educational evere e -is of enormous importance. If it is not carried out for a long time the improvement will not be muntained. Then too the after treatment need the intelligent co operation of the patient and many of the patients are ehildren who are mentally deticient if there is not enough mentality present to give one intelligent co operation the operation should not be undertaken

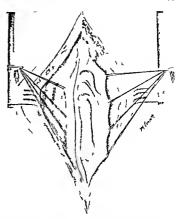


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In selected cases it still remains a most helpful procedure It is a formidable opera tion. The roots should be cut at their exits from the canal not at their origin from the cord At the latter point it is impossible to identify the different roots and as Foerster originally pointed out it is very important to select the roots in such a way that each group of muscles will have some sensory supply left. Any operative procedure for spistic paraplegia however should not be undertaken until it has been determined what has caused the paraplegia for spastic para plegia is only a symptom not a disease. Some years ago I removed an endothelioma from a girl who had been riding around in a wheel chair for 8 years with a diagnosis of spastic paraplegia. The tumor had not only com pressed the cord but had eroded one part of the body of the vertebra so that a tongue like process extended into the posterior mediastinum Its complete removal however brought no recovery in the legs as the cord had been permanently injured by prolonged compression If no focal lesion can be found then the Foerster operation may be con sidered for the relief of spastic paraplegia



I ig 6 Slov the tumo fter it w pat ils lifted out of its b d Patient has had nor turn of mptom



I ig 7 Type of vascular lesion in which one lar e vein compres es the cord This was dissected out without much difficulty

Of all the gratifying experiences in surgery I know of none greater than to make the paralyzed walk except perhaps to make the almost blind see This is what we can do by removing spinal tumors in time. The vast majority of spinal tumors are benign en capsulated growths growing from the dura They are either endotheliomata or fibromata With care they may be removed so that no increase of the spinal symptoms occurs and though it is rare to have all traces of spinal symptoms disappear they clear up to such an extent that the patients are useful citizens with no appreciable discomfort or disability There may be some increased reflexes or spasticity left or some sensory disturbance

The localization of a tumor frequently offers considerable difficulty. It may be possible to determine the level from the sensory disturbances the paralyses and disturbed reflexes. If by study of these one fails to establish the level the Queckenstedt test and finally an injection of lipiodol into the cisterian magna may be of great assist ance. I have never had any help from spinal



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air injection in the e ci e Lipio lol I use only when other method fail for there i no doubt a Aver has shown that it i irrititing though I have as yet cen no untoward amp tom from it. Occasionally all these ign ful is occurred in an unu unlea e of tumor of the terminal portion of the cord po ably of the filum terminale. In the cre the first and only complaint of the patient was inibility to empty his bladder. He went to a genito urinary surgeon who concluded that the bladder retention wa due to a cord lesion It operation we found the condition shows in Figures 5 and 6 This lesion did not obstruct the canal consequently both Queckenstedt and lipiodol tests were negative

The treatment of intramedullary tumors is far less satisfactory since most of them are ome form of gloma. Just what group these glomath belong to remains to be seen the new extological method of Hortega which Dr Wilder I einheld and Dr Bailey have done so much to improve and apply to tumors will enable us to pick out those that are favorable from an operative standpoint as well as those that respond to \text{\text{NY}} it reatment

Where is the operation of laminectomy is far simpler than a cranial operation it should be emphasized that the spinal cord tolerate manipulation far less than closs the brain Slight trauma of the cord during an operation may cause permanent disability. Some years ago I was obliged to reoperate upon a patient who had become totally paralyzed immediate ly after an exploratory operation el ewhere for a supposed tumor. At the site of the old operation I found a traumatized contused cord and from what information I could gather I believe that the lipping from a ron_eur cau ed this injury. The greatest gentlene must be used in the handling of the cord but of this and a few other te huical

matters I hall as a few words later on 1 certain group of cases presents the picture of a focal spinal le ion Such patients are difficult to handle ince they are entitled to an exploration yet at operation nothin can be done Two years and I reported a eries of 33 such cases. Lvery dia no tic method should be used to cut this number down as low as possible but where a lo alized lesion is demonstrated by lipiodol or the Oueckenstedt test an exploratory operation must be done to determine the nature of the lesion. In ome of these patients the leaon are due to old inflammatory proce es which have left adhesions which constrict the cord but in other ca es no gross pathological lesion is found and the reult of exploration is entirely negative

Among the group of spiral tumor blood vessel tumor may be encountered which pre ent atypical symptom and extremely difficult operative problems (Figs. 7 and 8). They deserve special mention because their symptoms are unlike those of a solid tumor and resemble those of the serie, jut referred

to—the arachnoiditis cases. Some of them are composed of a mass of thin walled vessels that cannot be removed by any of our present methods though it may be possible in future to deal with them by electrosurgical methods.

An entirely different group of patients that the neurosurgeon can do something for are those with intractable pain sometimes due to a malignant metastasis sometimes to tabes and sometimes to no detectable cause For these cases chordotomy the so called Spiller Frazier operation may be a great comfort It consists in the cutting on each side of the spinal cord of the anterolateral column which carries the pain fibers. The operation should be done high in the dorsal cord so as to catch the pain fibers well above the site of pain. When this is properly done the patient loses all sensation to pain below a certain level but retains normal touch and temperature sense. In a patient with a malignant metastasis to the spine the rehef may be complete and this obvirtes the use of opiates but it is only fair to say that chor dotomy does not always give complete rehef Whether this is due to a failure to get all the pain fibers or due to some other cause I do not know but not all the cases have yielded uniform results. To what extent the opera tion is applicable to patients with tabetic pains is also uncertain for some have com plete relief and others seem to have little or none The operation has to be carried out with great care for under the anterolateral column lies the crossed pyramidal tract If the incision is too deep a motor paralysis may be produced while if incision is not deep enough the pain may continue The tract that is cut is about 2 5 millimeters long and ? millimeters deep (Fig. 9)

The last group of cases which the general surgeon is frequently called upon to take care of consists of patients with congenital defects amous types of spina bifida. If unruptured and there is evidence of some nerve fibers passing into the lower extremities or some rectal control the patient should be operated upon at an early age. A considerable per centage develop hy drocephalus it is true but to be a considerable per centage develop hy drocephalus. It is true but to be a considerable per centage develop hy drocephalus.

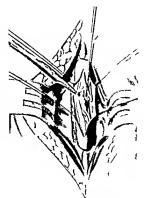


Fig. 9 The slows the may be rotated by grassen tells in a least a lo show the way in a least scut in a chord torus.

I know of no way of deligation which patients will daily. Pera possibility of hydrocytal and proceedings to the concerned although the care are concerned although the care to dura after the hermal to the dura after the hermal to the care are bone graft as less a bone graft as less are bone graft as less are those who are care those who

a child is at least and ton is done but this done but this done had all though it is true man, if left done and only it survive some of the true the sake of those fer resorted to early

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always make a mediun line mission and cirrs it down to the spinous processes than with great care the penosteum is stripped from the spinous processes so as not to injure the muscles. With this technique extremely little bleeding is encountered. The entire spinous processes is removed down to the articulating processes on each side. There is some difference of opinion about this. Taken advocates unilateral luminectomy in order to keep the spinal column stronger. Myster doc. not

remove the spinous proce st. Faylor has recently de cribed a number of cases in which cervical laminectomy was done and the patient suffered a forward discussion this should certainly be kept in mind is a possible complication. Whether the has possible complication. Whether the has occurred in my series of our 150 laminectomies I do not know for Taylor points out it may occur without symptom and only a lateral \(^1\) may picture will reveal it. I know of no patient who has had amptoms which might be ascribed to such a complication and am inclined to think that a very careful layer closure may preven it is occurrence.

After the canal is opened great care must be exercised not to injure the cord by pressure or sponging or getting blood into the subdural or subarachnoid space. No gauze sponges are ever allowed at this stage only the finest

quality of cotton and with the judicious use of suction the cord is gently handled If it becomes necessary to work in front of the cord or on one side the cord should be handled only by means of the heamentum denticulatum to retract the cord with a retractor is never permissible -that is quite enough to cause a paralysis below that point In order to do a chordotomy the cord has to be rotated over on degrees. This can be done by taking hold of the ligamentum denticula tum on cach side \o clamps are ever to be upplied to the cord. A bleeding point as a rule can be controlled with hot cotton and the application of a bit of muscle. Occasionally a ther class may be necessary to control a vessel This is much less harmful than the putting on of a damp and then the tying of the ses el Ií an endothelioma is encountered the dural portion from which it grows must alu as be excised as otherwise there is likely to be a recurrence If a large piece of dura i removed a fascial transplant may be nec essary to clo e the defect and prevent any ccrebrospinal leak but with a careful layer closure of muscles deep and superficial fascia a dural leak need never occur. A heavy gauze pad and binder is all these patients need for a dressing the old idea of a plaster dressin or plaster bed is totally unnecessary

A CLINICAL AND PATHOLOGICAL STUDY OF TWO TERATOMATOUS CYSTS OF THE SPINAL CORD, CONTAINING MUCUS AND CILIATED CELLS

BYLAWRENCE S KUBIE M.D. AND J.F. FULTON M.D. BOSTON
F. m.th. S. g. 1Ch. f.D. H. r.y C. hung P.t. B. t.Brigh m.H. p.t.l. d. fth. Ch.ld. H. p.t.l.

THE two cases which we are about to report present features which both from clinical and pathological stand points are interesting and puzzling. We propose therefore to record both aspects of the cases in some detail. It is perhaps worthy of note at the outset that in each patient symptoms appeared first at the age of 2 years but the second patient did not come to operation until 5 years after the onset of her trouble.

Case 1th Children's Hosp No 105 33 1 cyst arising from the dorsolateral surface of the upper lumbar cord was associated with occult spina bifida and suddenly produced symptoms of cord compression as boy two years of age. The cyst contained ciliade cells and mineus Dorsolumbar laminectomy extirpation of cyst recovery

D S an Irish box aged 2 years and months was first admitted to the Orthopsedic Clinic of the Children's Hospital Boston Viay 21 1927 discharged 3 month later and again admitted for further observation on July 2 1927. His family history contained nothing relevant to his condition in his own past history the only important fact was that he had always walked with a slight dragging imp of the right leg. He was admitted for the first time because he had recently been fretful and for several weeks had stopped eating and lost weight

The child cried almost constantly in apparent pain. His hack was rigid with intense spasm of the lower spinal muscles and he stood up only with the greatest reluctance When lying on his back he held his legs partially fixed and his pain seemed to be greater upon passive motion of the limbs especially at the left bip The clinical suggestion of tuber culosis of the bone was not borne out on repeated I ray examination and repeated tuberculin tests The roentgenogram revealed however a spina bifida occulta with incomplete fusion of the lower thoracic lumbar and sacral vertehræ most marked in the first second and third lumbar arches Neuro logical study revealed byperactive deep reflexes in both lower limbs but especially on the right there was also a poorly sustained ankle clonus and a pos itive Bahinski on the right. In the cour e of a few weeks he seemed to lo e whatever sphincter control

he had previously possessed and then developed an apparent zone of hyperæsthesia at the level of the umbilicus

Lumbar bunctures On June 13 a lumbar puncture vielded fluid that was contaminated with a small amount of fresh blood (presumably a bloody tap) The pressure under anæsthesia was normal and the response to jugular compression showed that there was no block. Six weeks later however on July o a pale yellow fluid was obtained at a second lumbar puncture containing two cells and a 4 plus I andy The fluid fulled to clot on standing On this occasion the cerebrospinal fluid pressure varied between o and 10 millimeters of fluid and there seemed to be little or no increase in the pres sure on compression of the jugular veins. In 6 weeks therefore a condition of at least partial block had developed and a xanthochromic non clotting fluid had appeared below the level of the suspected obstruction (It is possible but not likely that the color was due to blood introduced at the previous puncture)

Three days later a combined cistern and lumbar puncture was done The cerebrospinal fluid from the cisterna magna was normal and under normal pressure From the lumbar region bowever at a level one interspace above that of the earlier punc tures an entirely novel fluid was obtained fluid was so viscous that it bad to be aspirated with a syringe. It was in the main quite clear and color less with a few cloudy treaks running through it In appearance and in physical characteristics it was exactly like the white of a raw egg. In it were found 2700 cells which were incorrectly reported (from a counting chamber analysis) as lymphocytes No pressure measurements could he made upon this viscous fluid On August 3 an injection of lipoidol was made into the cisterna magna under ether Although the main mass remained anæsthesia above the level of the ninth dorsal vertebra scat tered droplets of lipoidal descended to the caudal tip of the dural sac. In the head down position the oil droplets which had previously slipped down past the dorsal level collected at a point helow the partial obstruction without repassing it

On August 5 therefore two diagnostic punctures were made one at the level of the tenth dorsal interspace and the second at the fourth lumbar. The upper puncture again secured a sample of the gelatinous mucoid fiuld. The cells of this fluid were examined by the supravital technique of Sabin (5) and were found to be predomnantly large round granular mononuclear citated cells (Fig. 7) with a

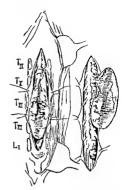


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few polymorphonuclea neutrophic leuc cut a few lumph cyt a and af wred blool cit list. The puncture at the lo er nter pace rel asel a lear flund it ha no m l ll ount a d fir tho gh sightly sluggish respons s t juggilar compress n it seemed evudent the clor that the thir a lof the viscous fluid at the upper level had I s ened the obstruction in the subartachooid pace ther by dimin shing the block and liminating the previously obser ed xanthochroma. Just before the poperation on August 1: the punctures of Vugust 5 werer peatel ith similar fi lings. Chemical amination of the vi cous fluid showed it to contain large amounts of mue a la total protein of 67; milligrams per oo cubic centimeters hile the cerebr spinal fluid from belo the I sion had lot its vinhochromet unit gav a negatic Wasse main

TABLE I -- SUMMARY OF LUMBAR PUNCTURE FINDINGS IN CASE I

TINDINGS IN CUE I						
D	Le 1	Fl 1	1	J _e ni pes		
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Fr. Tm. fCs. N. n. tpel. mm. dtly.ft. gthd. BSd. w. tructed tpeddoftm. dh. t. fatthm. ttth. d. (Fm.D. II. kthm.d. mm.d. tly.aft. pt. J.

t st a neg ti gold sol u and cont ined s; milligrams sugar 717 mill grams sod um chloride and 5 milligrams of t tal protein per oc cubic centimete s In short the fluid bel th lee lof th lesion va so normal but for a very light in crease in the total prot ins A summary of lumbar puncture findings is give in Table I

The fact be ought out by this series of studes may be summa - [als follo s]. V rap de elop ment of spinal block and e k anthochromi in the lumbar fluid in the iter al between purchased in the land of the lek and dispearance of the anth ch oma verving displayed a fugle reputure hich obtained the thick and the properties of the sum of all elof pretail of the iter a full (e p ritial acust in fithecy 1) (3). Dem station of all elof p ritial of tru it nat the ninth does all ertebra by 1p dol (4) R peated romovaled a egg vi the fild from the upp rlum

bar reg n bick conta ned ciliated cell a d m cin Operatio Operation was done \(\frac{1}{2}\) gust 1 bi Drs Gilbe t Horrax and \(\frac{7}{2}\) rac. Jackson Put m Laminectomy di closed thin the ubstachned space a site g ay sh mmering cyst neal \(\frac{6}{2}\) ce timeters \(\frac{1}{2}\) not all \(\frac{1}{2}\) contimeters in \(\frac{1}{2}\) and \(\frac{1}{2}\) ce timeters \(\frac{1}{2}\) day \(\frac{1}{2}\) on \(\frac{1}{2}\) and \(\frac{1}{2}\) day \(\frac{1}{2}\).

bich was b thed in cereb ospin I flu d a do e lay the cord from the level of the n nth do sal to the first lumbar vertebra A drawing mad from Dr. Horrax sexcellent operative sketch is given n F gur 2 On aspirat g the contents of this cy t into a

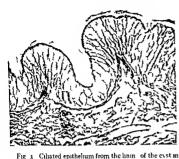
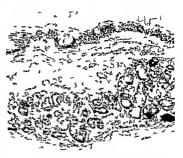


Fig. 3. Clisated epithelium from the limb of the cist of the Case 1 v 375. Stained in harmatoxylin or in after Zenker fixation and mordanting in Re, aud s solution. The cell borders basement membrane and at some points the granules on the cilia are clearly brow it out.

syringe it was found to contain both the viscous mucoid fluid and the ciliated cells which had al reads been obtained at lumbar puncture. Over the delicate surface of the cyst were fine blood vessels which gathered together at the level of the ninth dorsal spine into a fine and apparently solid stalk Through this stalk the cyst seemed to grow out of the right dorsolateral surface of the spinal cord approximately out of the tip of the dorsal horn of the grey matter! This vascular stalk was clipped with two silver clips and severed in between them The sac was promptly removed and fixed in Zenker's fluid No central channel could be made out through the stump of the stalk. The cord beneath where the cyst had pressed against it was slightly flattened At the lower end of the cord just above the cauda equing there was imbedded in the right side a hard nodule about the size of a pea. This was left un touched

Histological appearance The sections were stuned in harmatoxylineosin carmalum phosphotungstic acid hrematoxylin (Millory) and after secondary mordanting in Regaud's solution unsuccessful at tempts to secure mitochondria stains were made with acid fuchsin methyl green (Cowdry)

The greater part of the cyst wall was of almost paper thunness and at only one point was there pal pable thickening. Sectioning of the cyst showed that the thin membranous wall consisted of a cap sule of connective tissue and blood vessels which was lined by a layer of epithelium. The epithelial layer was composed of cells which varied in structure from low cuboidat to high columnar and in places patches of uncovered connective tissue could



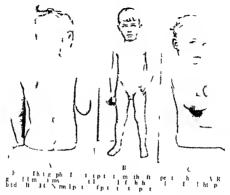
 Γ_{1-4} Thickened area of the cyst wall from Case r τ 6. Zenker hermatoxylineo in The dilated vascular channel and the mucous and serous glands are seen in their relation to the epithelium

be seen denuded of their epithelial layer. The area of thickening in the wall however presented a pic ture of surprising complexity. Here the epithelium was made up of tall columnar cells in pseudo strati fied lavers 'The cells were ciliated at their free bor der and lengthened out to form long tails which pointed centrifugally toward a fairly well defined hasement membrane (Fig 3) Below this were found abundant blood vessel connective tissue and actively secreting mucous and serous glands (Fig 4) There were in addition some interstitial hæmor rhages (which might conceivably have been induced at the operation) and polymorphonuclear leucocytes were scattered sparingly throughout the tissue without any point of great concentration suggest ing a subacute inflammatory process muscle was also present. A few large myelinated nerve fibers were seen but there were no nerve cells or glial elements

Fostoperative course — The postoperative course of the child in the hospital was uneventful. Within a few days he had ceased his previously incessint crying and was a little less alarmed when approached the hyperesthetic zone over the abdomen and thinghs was gone control of the sphinicters returned and the reflex changes became much less clear cut. He was sent to a convalescent nursing home on August 6.

The child was last examined on February 11 1928 At this time he ran around the examining room without apparent disability. No knee jerk could be obtained on the left side and on the right only a feelile and inconstant response. The ankle jerks on the other hand were active and again the right side was more active than the left. The cremasteric refleves were present on both sides but sluggish on the right. The abdominal refleves were absent in

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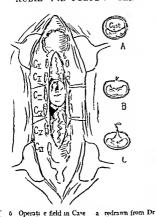
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Cu hin, a simmediate postoperati e sketch ittin, appear ance and approximate posit on of the les on the o's trans, erse sketch of the event in sith shown the con pres on of the pinal cord beneath it. B. The cloure of them o er remainin adherent portion of cs. t. C. What eccording to operator would presumably has e been a more effective way of dealing with lesion in view of it possible future redevelopment.

no ition in bed she immediately become dy procic and crie out that she i suffocating marked pain when an attempt was made to bend her headhackward It was observed also that her left orm and hand were smaller then her right (glove measure s centimeters right 16 centimeter left also I centimeter difference in diameter and in length of arms no difference in legs) and there appeared to he vasting of the flexor muscles of the left arm and of the left hypothenar eminence reflexes on the left were markedly increased and there was per i tent patellar and ankle clinus While she was under ob ervation her condition rapidly improved and she was discharged on Septem ber 9 1009 with a tentative diagnosis of hy teria Improvement continued and 3 to 4 months from the on et of the attack he was again perfectly well

At the age of 1 the same thing once more occurred Again the vimptom began with stiffness of the neck followed closely by pain in the left 1 de of the neck and in the left houlder and finally by a gradual development of paralist. The weakness appeared fir t on the left side but in the attack the pare is also spread to the right until in the end paraly 1 and numbness evited all inver her



Fig. Case New petures of cervical remon after operation. Note the shight widening of upper cervical canal. In this nim the position of the interchip shows the exact be elocal attachment of the cost to the pinal coordinate use of the cost in discated his dots. The pinous proces he and laming are missing from the econd to the suth indus i.e.

trunk and four extremities During this attack the patient again suffered agonizing pain in her neck and shoulder The paraly 1 was not absolute -enough voluntary power remaining to enable the patient to work herself around in bed. There were no sohincter difficulties Recovery again set in with great rapidity and the time it was initiated hy a sudden sen ation that something had happened in the back of the neck. Within a few days after this en ation occurred practically all of the symptoms had disappeared. At no time had there been any headache fever diplopia or other cramal nerve disturbance and no convulsions or other manifestations of forebrain pathology After thi attack the patient's left hand remained permanently weak and never developed as completely as the right However during the 15 years which intervened between this attack and her pre ent seizure it usefulne s in her occupation of stenography was but little impaired. Almo t every summer since this attack the patient suffered from short periods of steffness of her neck and some numbness and pain and neca innally some mu cular weaknes in her left arm These abortine attacks always pa ed off however with rest in bed

Present attack On Augu t 1 10, the present attack developed The sequence in which the symptoms appeared was almost exactly that of the



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and had lay in prittal fi vor spasm much of the time it coil by a kil, fle ad a the elbo a d som lu tary mot nof the fing r as possible. The shit was faced and in motio less The patient culd it v both lig ve kly at the hps and knee the lift moe than the right and while free motion of the kli to s as possible non as present on the ght sid. With the moe of a mi a tio ther fraithough the paralysis had begun on the left id, it had become me reprofound on the right.

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lar stimulat on of the upper limb ca sed ipsilateral



Fig o Another area of the cyst wall of Case x 75. I ormal n Zenker mordant hemato ylun costs. Here the epithelium is seen to form deep branching inva mations, throu h the layer of smooth muscle and lymphod infiltration. Still deeper are seen mucous and serous gland fatcells etc.

extensor spasm of the arm with flexion of the hand and sometimes a spread of the risponse to include flexion of the ipsilateral leg with contralateral extension. It is perhap significant that there was spread ing of these in oluntary associated reflexes from the upper extremities to the lower but not vice versa. There were also frequent attacks of spontaneous uncontrollable movements from time to time occurring possibly on the basis of accidental skin stimulation Sudden violent extension of the arms with flexion of the fingers at the proximal joints was especially frequent.

Objective sensory disturbances All disturbances of sensation were found below a line which ran from the top of the accomion on the shoulders to a point 2 inches below the episternal notch on the sternum corresponding roughly to the lower limits of the sensory distribution of the third and fourth cervicals Below this level she presented a more or less typical Brown Sequard sensory dissociation. Heat cold and pain were grossly impaired all over the right side below this level but were less impaired on the fet whereas position sense was only partly impaired on the right side but was more grossly affected on the left.

Minor symptoms The patient had suffered from chronic constipation for some time and for 2 days

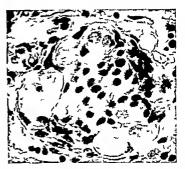


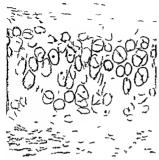
Fig. 11. A clump of cell which resemble gan 1 on cell from leep in the cy t wall of Case 2 x 650. I ormalin Zenker mordant liæmatoxylin cosin.

had had urmary retention so that catheterization was necessary on admission. The skin showed excessive dermatography and even gentle pinching caused a ripid development of subcutaneous ecchy moses. The patient was extremely obese. The left side of the body was warmer than the right

Summery A young woman 27 years of age had had recurrent attacks of paresis of extremities with subjective sense of numbness in trunk and limbs On admi sion to the hospital she had almost com plete paralysis of all four extremities and of the intercostal muscles with extreme hyperactivity of reflexes the greater reflex hyperexcitability being on the left side the greater loss of voluntary motion on the right She suffered from constipation urinary retention and vasomotor skin disturbances (i c dermographism ecchymoses and uneven distribution of skin temperature) Root pains extended up the back of the neck and down the shoulders and were intensified by coughing sneezing or com-pression of the jugular veins. Below the level of sensory distribution of the fourth cervical nerve there was marked diminution of all cutaneous sen sation —with a tendency to a Brown Sequard disso ciation-ie with pain temperature and light touch more involved on the right and paralysis and posi tion sense more involved on the left

Impression Compression of the cord at the level of fourth cervical most marked on the left side. With the recent experience of Case 1 in mind the suggestion was ventured that this might prove to be a similar congenital cyst either with or without association with spina bifida.

Pre operative course. On the afternoon of Septem ber 9 the day following admission the pitient was taken to the \ray room to have films made of her



The Ctlafmti II fth stat

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Ob at 1 was 1 ne S nt mber o 027 by Dr Cushing Ih icat nwa p fo m I with unusual d ffic ltv pa tly on a c nt of the patient sextr me be ity pathy b cas fh r respiratory diff ulti s which n face do n p s t n t nd d to inc ease but more particularly becaus sh ma f ted through ut th operatio the sam hæmo h gic tendency which his high a shown by he proneness to levelop sub ut no e chym es during her e aminations E ery suf e oo d blood almost constantly so that even after the emoval of the cyst a long time as spent merely n checking this p sistent ble d g Alaminectomy of the middle x ervical crt bas ith partial remo 1 f the oc ipital bon a und the fo amen m g um s s finally mad gre t care being exerci d le t the tr uma of the procedure increase the x t ng pressure symptom



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thought ought to have been done with it (Fig 6 C) to lessen the likelihood of recurrence is given here

with The cyst was fixed in formalin

Histological examination This cyst was relatively heavy walled (Fig 8) varying between 1 millimeter and 2 millimeters in thickness Niewed from the inside it was seen to be split by ridges and grooves into an irregular cavity. At one point however the wall reached a thickness of nearly 3 millimeters Sections were cut through everal regions and stained as in Case 1 As in the other cyst the thinner areas were relatively simple toward the lumen was an epithelial layer consisting of low cuboidal to high columnar cells Outside this lay not only connective tissue but also long flat bands of smooth muscle (Fig. o) On nearing the thickened zone groups of glands were seen (Fig. 10) and complex branching invaginations of the cpithelium (Fig. 10) Finally in the widest area were great masses of lymphoid tissue (Fig 9) abundant smooth muscle bands (1 igs o and to) many blood vessels some cartilage (Fig 12) and-as in the other-quite extensive inter stitual hæmorrhages with some evidence of acute inflammation Many small bundles of myelinated nerve fibers were found and in one area large round cells which resemble nerve cells (Fig 7) but since special stains for tigroid substance and neurofibrillæ were not made because of the fixation their positive identification is open to doubt. Next to the lumen of the cvst was an epithelial layer of pseudo stratified columnar cells with cilia and pointed tails leading centrifugally toward a basement membrane (Fig. 13) In the connective tissue near the meningeal surface were occasional solidly calcified blood vessels form ing typical psammoma bodies

Postoperati e course. An immediate and dramatic return of function began even before the patient was removed from the operating table \oluntary flexion and extension could be performed weakly at both wrists there was free movement of the fingers flexion and extension of the ankles flexion of the knees and a beginning return to thoracic respira

During the succeeding 4 hours the improvement went on hour by hour Full participation of the intercostal muscles in the movements of respiration Micturition was possible Voluntary movements of the extremities became increasingly free with the greater improvement taking place first on the left side and in the distal joints of the limbs The overactivity of the deep reflexes dim inished the clonus phenomena were lessened and the abnormal re ponses to cutaneous stimuli under went a similar change Sensation on the whole re turned more slowly than motor functions There was however some improvement in sensation within the first 24 hours and this brought into clearer relief the difference which had been observed before the operation between the distribution of the defective cutaneous and deep sensations. Thus the per ception of all cutaneous stimuli (touch pain and temperature) improved markedly on the left side but not on the right while the recognition of pas movement of the limbs became more accurate on right side but remained wholly impossible on left After a few hours of pronounced vasomdisturbances with elevation of temperature an recorded axillary temperature that was a degree higher on the right than on the left side all of disturbances of the autonomic nervous system minished The left pupil became nearly as larg the right although the left enophthalmos contir noticeable for nearly 10 days

Seven days after the operation the improven in voluntary motion had become striking Babinski reactions were negative the deep refl upon the left side alone were still hyperactive There was impre clonus was very inconstant ment in all of the sensory responses but the sens

dissociation was still marked

Fourteen days after operation the patient w her first letter and walked a few steps with a tance In everything except position sense on left side there now was marked improvement this one defect continued relatively unimproeven at the time of her discharge. Of the involunreflexes already described only the tendency to fit clonus in the left hand now persisted but cer new observations were made of reflex hyperes ability in this region ie involuntary contrac of adjacent fingers when any one finger was force extended involuntary flexion of the thumb forceful flexion of the middle digit (Mayer's refl

On October 3 cutaneous sensation was norma the left side and had shown marked improven in the right arm although not in the right Sense of position was normal on the right but seriously impaired on the left. The patient wal freely dressed herself fed herself and wrote fair ease She did not feel up to her normal stren however and all of these activities fatigued Involuntary reflexes had almost disappeared f the arms although they still persisted in the hand The Babinski responses were usually nega on both sides although an equivocal response co sometimes be obtained from the left foot A po sustained inkle and patellar clonus was still to observed on the left but not on the right and though there was no crossing of reflex respo from the left to the right side stimulation of right patella caused slight contraction of the adductors The defensive reflexes had almost Finally it was striking that the Achilles tendon was still acutely sensitive while right was almost anæsthetic so that it is evid that deep pain follows cutaneous pain pathy and not those of deep position sense

October 12 The patient was discharged At time she was making slow but steady progress her final examination it became clear that there i associated with her defective muscle and joint so on the left side a marked impairment of two p discrimination and an almost total astereogne Both of these sensory functions were unimpaired on the right side

On February 11 1928 the patient reported that she had been back at her old position as stemographer for 2 months but that she still became fatigued easily and that her left arm hand and leg were a little weak and clumsy In walking her balance was still slightly insecure and she continued to use a cane. Neurological examinations by local physician showed that the left abdominal reflexes were still absent that the kines jerk on the left side via still evangerated and that there was a tendency to ankle clonus on the left. Earlier reports from the patient had showed that the astereognosis on the left side was improving

In a later report written on March 8 1928 she states My walking has greatly improved I can walk quite a little faster and am much more sure on my feet and use the cane only when it is extremely slippery I seem to bave a great deal more con fidence in my ability to stand on my feet that I do stagger a little occasionally that is I am ap to lose my balance if I do not watch myself but as other people also notice that I walk better and I do myself I know there is an impro ement I am wait ing anxiously for spir ne and clear sidewally.

Last night I went through the test of identifying objects in my left hand and was able to name every one I believe there were about a dozen I am able to move things around in my hand and thus feel of them with my fingers which of course makes it much easier to ident is them I do not believe that my band is yet back to where it was before this last illness but it is becoming more useful all the time and if I could but salk all right Is ould not complain at all We also tried hot and cold glasses on my legs Of course in the left leg I could tell both beat and cold immediately but in the right the sense of beat was still a little hay although I could tell the cold glass at once That sense of feeling also had im proved over the last time. I was also able to tell every direction that my toes were moved in except once in the left foot I missed but evidently my sense of movement in that foot is improved. So taking it all in all I consider that there is a decided improve ment What do you think?

I stil have the pain between my shoulders and in the back of my neck when overtired but never unless I ha e worked too hard I really feel that I can not ask for shorter hours as I work only from 845 AM to 5 P at with an hour and a half for lunch and I feel that they pay me too well and have been ent with me for so long that I must get all the work done that there is to do and I do not believe that I will have it when I have gotten stronger I am sorry that I can not report any loss of weight I may far all I am not ve y cood at deture to

DISCUSSION OF THE PRE OPERATIVE AND POST OPERATIVE COURSE OF CASE

In this attack, as in the earlier ones the paralysis appeared first and persisted longest on the left side Nevertheless durin the height of the process it was the ri ht side which showed the more profound loss of power The left side also showed from first to last more marked reflex hyperexutability than the right The explanation which naturally suggests itself for these seemin ly paradovical facts is that the right side suffered the more recent injury and hence manifested the flaccidity of spinal shock while on the left side we were presumably dealin with a condition of chronic impairment of the upper motor neurones spinal shock havia long since passed off

The distribution and recovery of sen or impairment were particularly instructive. There is much confusion in the clinical literature concerning the Brown Sequard syndrome. In his Course of Lectures on the Physiology and Pathology of the Central Nervous System delivered at the Royal College of Surgeons in England in May 1858 (I hiladelphia 1860). Brown Sequard deals at length with his experiments upon hemisection of the cord in animals and discusses the clinical correlations of his physiological observations. Here he desembes clearly the effects of transecting half of the cord below the decussation of the pyramids (eg. high in the corporal leaf). This con page 12, 15 says.

decussation of the pyramids (eg high in the cerucal level) Thus on page III he says In a spinal cord an alteration in a lateral half produces hyperesthe is and paralysi of movement in the corresponding side behind the place of the alteration (that is caudal) and the loss of sensibility without the los of movement in the opposite side (see 3 Fi Again on page 200 he says 21) the decussation of the pyramids a lesion in (half) the spinal cord produces paralysis in the same side and an esthe ia in the opposite This is the simplest manifestation of the Brown Sequard syndrome A usual cor relation which was apparently not recomized by Brown Sequard or at least is not men tioned in his work is the loss of position sense on the same side as the lesion analysis of the syndrome has been given by many subsequent writers notably Schitten helm (28) Fuernrohr (13) and Kron (22)

This patient showed clearly this classical dissociation her paralysis appeared first on

the left side whereas the defective cutaneous sensibility was first noticed on the right Dur ing the height of her illness the picture was recognizable although somewhat confused but again during her convalescence and at discharge the fundamental distribution of symptoms was in accordance with the classical law Her chief motor weakness was again on the left side and her reflexes were exaggerated on the left On the right side her motor power was practically normal but there remained a marked diminution in the acuity of her responses to pain temperature and touch Furthermore muscle and joint sense the fibers of which fail to cross within the cord itself was defective on the side of the greater motor difficulty (left)

Despite the loss of kinesthetic and postural sensations from muscles tendons and joints of the left side painful sensations from these structures (as from pinching the Achilles tendon) were acutely perceived on the right side deep pain was markedly diminished along with cutaneous pain. The fibers which mediate deep pain must therefore run in close proximity to those of cutaneous pain. It is significant that even with normal acuity of the sense of light touch on the left side the patient had nevertheless a high degree of posterior column astereognosis and a marked loss in power of discriminating two

points

Careful analysis of this patient's post operative course shows that the various sensory and motor functions returned in the receive order from that in which they dis appeared. The left arm (though affected early) was the last to become completely paralyzed and it was the first to come back following operation. Similarly the left side was the last to become numb to pinprick and its sensation returned very much sooner than did the right. This indeed one would expect on a priori grounds.

It is also significant that throughout her period of recovery motor functions tended to return more quickly than sensory and of the components of sensation the slowest to recover completely were the more highly developed qualities of sensation such as light touch and the ability to perceive the texture of materials

Pain on the other hand, returned more rapidly. This is important for it is known that pain is mediated by fibers of small diameter, and these being less susceptible to compression than larger fibers (Gasser and Erlanger 16) are likely to be less affected by a tumor than the larger fibers which mediate muscle sense and other of the more highly discriminative qualities of sensation. It may be emphasized also that pressure upon bundles of conducting nerve fibers such as those of the optic nerve and spinal cord may serve to interrupt the passage of impulses without destruction of the structures themselves.

THE GENESIS OF THE CYSTS

Both cysts were lined by ciliated columnar epithelium with a subjacent layer containing mucous and probably also serous glands The wall of the cyst from the two year old infant had remained fairly simple connective tissue blood vessels a little smooth muscle a few nerve fibers and occasional polymorpho nuclear neutrophilic leucocytes were all that could be found The cyst from the 27 year old patient with a history of four or five attacks due evidently to increase in size of the cyst with resulting compression of the spinal cord had a more complex wall. Here the smooth muscle was well developed and abun dant and patches of cartilage had also formed There was evidence of recent infiltration with polymorphonuclear leucocytes and of a more longstanding accumulation of lymphoid cells not unlike atypical lymph follicles There were also perve fibers and possibly a few ganglion cells

The classification of these cysts depends in part upon which of all of these elements are held to be part of the primary beteropla sia and which are looked upon as accessory supporting or inflammatory adjuncts. Cer tainly the cihated epithelium and the glandular elements are part of the primary tumor and it is difficult to regard smooth muscle and cartilage as purely reactive in origin. The cysts must therefore be looked upon as teratomatous in nature.

There has long been a feeling of uncertainty as to the nature and origin of cysts which are lined with chiated cells Within the skin itself

ectoderm rarely gives rise to cysts containing ciliated cells Hess (18) has reported one case For the most part such cysts arise only in case an entodermal vestige (branchial clefts neurenteric canal etc) is the probable source of the tumor (Mallory 23) The mor phological similarity of the linings of such cysts to the epithelium of the upper respira tory tract and of the fetal gut has impressed many observers and when as in these two cases mucous and serous glands have de veloped the analogy-particularly to re pir atory epithelium-becomes even more strik ing. It is nevertheless difficult to understand how a true implantation of entoderm can occur on the lower cervical or upper lumbar region of the spinal cord. One is therefore forced to consider alternative interpretations

The second possibility which suggests itself is that the cysts were formed during the closure of the neural tube by a fortuitous in folding of ectodermal cells. One must recall however that the ordinary dermoid or epidermoid cyst of the central nervous system is lined by stratified squamous epithelium the central cavity of the cyst containing a mass of desquamated fatty cells and often cholesterin (whence the name cholestea toma) As is well known such costs may also contain hair their surface moreover is often pale hard and glistening-which con dition has given rise to the other name cur rent for such neoplasms Tumeurs Perlees With these tumors the two evets described here have little in common (see Bailey 3 Bailey 4 Cushing 7 Horrax 1)

A third alternative is that our cysts represent ciliated fetal ependyma. Although the successful outcome of the operations made it impossible to establish the inner relationship of the cysts to the central canal of the spinal cord the direct connection of the cysts with the surface of the cord suggests that they might have arisen by an extrimedullary out pocketing of the central canal—an extra medullary synngomy elia (see Andre Thomas and Quercy 1). This neurogenic interpretation receives some support from the finding of 1 clump of what appear to be ganglion cells in the wall of cyst 2 and of buts of nerve fiber in both. However, no glial elements were

present and such an explanation fails to account for the presence of mucous and serous glands associated in normal structural relationship with an ependymal derivative

The final possibility acknowledges our in ability to make any of the preceding theories harmonize with all of the facts and suggests merely that any type of fetal epithelium whatever its origin may under special in known circumstances dee elop columnar epithelium possessing cilia. If this is the case the effort to find close analogies in adult it such is objuously useless.

hough inclined toward the last of these various hypotheses we find ourselves quite unable to make a definite choice without the further information which could be gained only at necropsy. The cysts may therefore be looked upon as teratomata with entodermal cothelium and gland to which have been added ectodermal elements (nerve fibers) and mesoblastic structures or they may be thought of as dermoid which for unknown reasons have undergone a type of epithelial and glandular development which is rare in the central nervous system and which have added a mesoblastic component or finally they may be interpreted as ependymal in origin with cpiblastic (glandular) and meso blastic additions

LITERATURE

A careful search of the literature has revealed no record of cases which are evacily comparable to the cysts reported here. A few instances of tumors have been gathered together however because they have features which suggest analogies to the e two cases.

In 1866 Eberth (9) described a cyst im bedded in the occupital lobe of the left hem sphere. The cyst was club shaped and the narrow canal of the handle stretched toward the occupital pole of the posterior hom of the lateral ventricle finally merging with the ependyma of the ventricle by a solid stalk. This cyst was lined by a columnar chated epithelium and Eberth believed it to be a heterotopic bit of ventricle in which the ependyma had retained its fetal cilia. He comments that as frequent as are cysts in the brain with a lining of flattened pavement.

epithelium so rare are cysts with a columnar ciliated lining 1

In 1887 Strassmann and Strecker (20) de scribed a polycystic tumor of the choroid plexus of a three year old boy The cyst walls contained ganglion cells nerve fibers glia connective tissue smooth and striated muscle hyalin and fibrous cartilage bone fat acinous and tubular glands with cylindrical epithe hum blood vessels and hamorrhage cysts were lined by single layered and strati fied epithelium and in some instances the epithelium was ciliated Presumably this latter type of epithelium was composed of columnar cells but the structure of the epithe lium of the cyst as a whole is not made clear Nor is it clear whether the glands were of the type of mucous glands

In 1894 Arnold () described an anomaly which was found at autopsy in a child that died shortly after birth. There was a spina bifida with a huge double external cyst The inner cyst was composed of a myelomenin gocele the wall of which contained nerve cells and glia muscle fat glands and cartilage The cyst was lined with cylindrical epithelium which was continuous with the ependyma of the central canal The presence of neural elements in the wall of a my clocele is of course to be expected and the accompanying development of mesoblastic tissue might well be interpreted as a response to the need for support of this anomalous structure presence of gland like elements however sug gests a relationship to our two cases especially to the child with the spina bifida occulta Unfortunately the exact nature of these glands is not made clear

In 1896 Saver (26) described a large nodular and cystic tumor which was found in the third ventricle of a 7 weeks old child attached only to the tela chorioidea. This tumor contained neural elements epidermal

elements (glands cysts etc) muscle and cartilage. The evact nature of the cyst epi thelium and of the glands is not made clear, but the occurrence of such a tumor at this point of mid dorsal closure of the neural tube is in many ways analogous to the two cysts

described in the present report Rosenthal in 1808 (24) described an intra medullary tumor which he called a neuro epithelioma gliomatosum microcysticum The tumor was in the lower dorsal cord and seemed to have connections both with the central canal and with the meninges It contained multiple cysts and canals which were lined by cylindrical epithelium on the free border of which occasional cilia were seen. The tumor terminated above in gliosis and below in ghosis and a syringomy cha of the central canal The cells lining some of the cysts suggest ependymal derivation but other cysts as seen in the illustrations are gland like with al buminous contents (Rosenthal) this tumor is in any sense analogous to the two under discussion here is doubtful because of its intramedullary position but the gland like appearance of some of the cysts and the meningeal attachments make it possible that it could be a similar tumor which has become infolded within the cord itself

In 1898 Frachkel and Benda (11) described a group of multiple cysts which seemed to arise from the meninges but which neverthe less were lined by an epithelium which suggested ependyma. It is not clear whether these cysts actually attached to the cord it self.

In the same year Trachtenberg (30) reported a case which is relevant only because it affords a sharp contrast to the essential structure of these two cysts. The patient had multiple tumors of the arachnoid over the dorsal surface of the cord from the cervical region to the cauda equina. These tumors were small nodules containing a soft yellowish pulp within a thin wall. The thin walls were made up of connective tissue without epithe lial covering smooth muscle fat balls of horny epithelial cells and sebaceous glands. These glands were lined by stratified squamous epithelium only two small glands were seen near the others with columnar epithe.

A mi cych i the prid by Tive(4) difficient m will What it light m which he phy time will What it light m will What it light m will will be so feld may be different to the property of the solution of the property of the pro

lum but without clear lumina. The author believes these to be typical multiple dermoids of the central nervous system and they show the structure which is characteristic for the usual dermoid tumors of this region in con trast to the tumors reported here. Similarly Hale White and Fripp 5 (17) dermoid (con taining stratified epithelium sweat glands and hair follicles) at the third dorsal level has little in common with our cases. Herzog 5 (19) ependymal cyst of the cerebellum did not contain ciliated cells.

In 1902 Saver (27 Case 3) reported another tumor of the leptomeninges which filled the lower lumbar and sacral canal with a large jelly like cystic mass which was lined by papilla of tall epithelial cells. Any connection with the cord is not clearly demon strated but the author sugge to a possible origin in the filum terminale and believes that the epithelium may be ependy mal in nature.

In 1904 Bittorf (6) described in the dorsal cord of a 55 year old man a tumor which lay in the subarachnoid space attached to the spinal cord. It was cystic and was lined by cubical or cylindrial epithelium which was stratified at places. A cuticle or possible cilia could be seen (the material was imperfectly fixed in formalin? The cysts were in continuity with syringomyelic cavities within the cord. At a slightly lower level of the cord a neuroma like nodule was seen which recalls the similar associated defect which was observed at operation in the first of our true cases.

Andre Thomas and Quercy (1) reported a similar case in 101 but unfortunately no clinical details were available. A cyst communicating with the central canal of the spinal cord at the 5th or 6th cervical level (causing the cord in this region to be extremely flattened) was found to contain glial elements (superficial) connective tissue strated muscle many blood vessels and was lined with typical polyhedral ependymil cells but no mention is made of their being cliated. There was also a dilatation and gliosis of the central canal from the cervical to the lumbar region.

Bielschowsky and Unger (5) describe (with full clinical details) a somewhat similar case of extensive ghosis and syringomyelia asso crated with a teratomatous area in the upper cervical cord which contained in rowin hairs with foreign body giant cells and several small cysts lined with skin like epithelium. The case came to necropy following operation and was crafellly studied

Frazier (12 p 513) mentions having oper ited on one teratoma and two demoids of the cord and Elsberg (to p 248) state that he removed a spiral cord cyst but no clinical or pathological details are given concerning any of these four cases.

Finally without venturing any answer the que tion may justly be raised whether these cysts have any relationship to the papillomata of the choroid plexus described by Davis and Cushing (8) One must allow for the fact that the papillomata arise within the ventricle and develop an abundant vil lous like structure whereas these custs if pushed outward from the canal could develop only a limited papillary infolding within the confines of the tense and distended sac Nevertheless except for the lack of cha there are striking resemblances in the cell morphology and granulation of the epithelial laver of the papillomata and of the cyst Moreover it is striking that it is in tumors of the choroid plexus or tela chorioidea which have attained a somewhat more complex structure than these described by Davis and Cushing (i.e. those of Strassmann and Strecker and of Saver 1806 g v above) that malformations most closely resembling our two cysts have been reported In any case it seems justifiable to conclude that the whole line of dorso medial closure of the neural tube is a region in which a teratomatous or det moid tumor of the central nervous system may form which is unlike the usual dermoid of this organ in that it may contain a ciliated epithelium resembling fetal ependyma ele ments which are clearly neural and other quite unrelated structures such as gland smooth muscle and cartilage

SUMMARY

Two cases of teratomatous cysts of the spinal cord are described which were suc cessfully removed at operation Both con tained chiated cells The first patient a child of 2 years who came under observation because of irritability and tender abdomen gave a history of always having dragged its right foot Repeated lumhar punctures at tenth eleventh dorsal vertebræ level gave thick egg white fluid filled with ciliated cells At operation a large flattened cyst was found extending from tenth dorsal to fourth lumhar vertehræ Histologically it proved to he a relatively simple teratoma lined with ciliated columnar epithelium. The child re covered and hecame symptom free

The second patient an unmarried female American of 27 had had five attacks of left hemiplegia with pain in left cervical region and Brown Sequard dissociation of sensation in trunk and extremities (pain and thermic sense absent on the right loss of position sensation on left with astereognosis) at vary ing intervals since the age of two Her pres ent attack developed into an almost complete quadriplegia with an upper level of sensory disturbance at fourth cervical and grave em barrassment of respiration Dr Cushing removed a cyst filled with mucus and ciliated cells attached to the left side of the cord at the third fourth cervical vertebræ level Histolog ically this cyst was found to be a more com plex teratoma than the preceding with changes compatible with its greater age After oper ation patient had an immediate and dramatic recovery of power with marked though less complete return of sensation Both cysts were congenital and probably represent ependymal diverticula of the central canal of the spinal cord

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ORIGINAL FEATURES IN ARTHROPLASTY OF THE LNEE WITH IMPROVED PROGNOSIS¹

BY ITED H ALBIT MD SCD IACS NEW YORK

O the patient with bony ankylosis of the knee a functioning joint with ade quate mobility and stability is his object in seeking an arthroplastic operation Whether or not the surgeon follows anatomical contours in modelling the new joint does not interest him so long as the joint functions It has been found by Allison and Brooks that it is absolutely impossible to duplicate expenmentally or in surgically constructed joints at the knee the normal gliding of the articular bone surfaces This being true and as at tempts to approximate the contour of the normal joint are so often followed by lateral instability. I have devised a technique based on well known mechanical principles which ignores the normal contours of the joint and provides both mobility and stability given excellent results in 10 cases

In the bone modeling wide V shaped in cisions replace the usual attempts to follow normal bony contours when viewed interiorly (Fig. 1). The convex wedge shaped plane surfaces of the femur fit accurately into the concave wedge shaped plane surfaces of the tubia. Weight bearing forces the spec of the wedge shaped end of the femur so irmly into the tubia that the danger of lateral instability is practically eliminated and a definitely improved prognosis is afforded.

At the Sixth Congress of the International Society of Surgery held in London in 19 arthroplasty was one of the major subjects of discussion and it is noteworthy that opinion was at that time divided between those who still behieved arthroplasty of the knee to be extremely hazardous and those who felt that the field for its use was definitely enlarging—that to undertake it in carefully selected cases should no longer be regarded as indication of undue surgical boldness

Eight countries were represented in this discussion

Italy Putti France Tuffier Lenche Santy England Hey Groves Ireland De Courcy Wheeler and Stoney Czecho Slovakia Jira sek Spain Ribas Ribas Suredand Coraclian Poland Jurasz a former pupil of I nyr and America MacAusland Manyood results were reported by Putit and MacAusland suggested certain changes in technique Jones and Lovett in the same year stated that the operation was still on trial (7)

Up to s years ago my own attitude con cerning arthroplasty to produce mobility in bony ankylosed knees (fibrous ankylosis will not be considered in this paper) was one of great conservatism both because of personal experience and because of observations which I had made upon several of Dr Murphy s cases of arthroplasty which had subsequently come to me before and after his death. These patients either had insufficient motion to satisfy them or more often the degree of mobility was satisfactory but lateral in stability was present and proved so trouble some as to offset the advantages of mobility In view of such results following Murphy s excellent technique and of my experience with three personal cases prior to 1920 I adopted the attitude that a patient would have to persuade me into undertakin an arthroplastic procedure upon the knee In 19 o I devised the technique described and applied it to two cases with good results between 1920 and 1922 nevertheless I kept a conservative attitude until 1023 when a patient (Case 3) for whom I had done an arthrodesis 4 years earlier for old tuberculosis of the joint returned and begged me to per form an operation to give her motion Her parent were equally urgent in their plea

The tuberculosis had existed since the pritient was 17 months of age. The arthro desis had been performed when she was six teen. At this operation the posterior part of the patella the infected posterior portion had been sawed away, and the rest of the patella left with one half of its posterior cut surface in contact with the femur and one half with

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the tibin for the purpose of supplementing bone growth and of acting as a pedicle graft in producing the ankylosis. This procedure was contrary to the older methods in which the patella was enucleated but proved very fortunate when the subsequent arthroplasty was attempted.

If ever my position was one of demanding persuasion to do an operation it was in this case as I was fully aware of the danger of causing a relapse of the old tuberculosis as well as of the unfavorable prognosis in arthroplasty of the knee. Both patient and parents were however so persistent in their request that I finally consented to operate but only after assurance by all that I would be absolved from any responsibility or blame if the tuber culosis relapsed or the result of the operation proved unsatisfactory. Quite contrary to my expectations the result was evcellent. There was adequate mobility and no lateral instability (figs 9 10 11)

In the light of the good result in this case my point of view regarding arthroplasty of the knee changed considerably and I have since operated on 7 cases with good results

making a total of 10 cases

With proper selection of cases meticulous attention to technique and intelligent post operative physiotherapy. I believe that the prognosis for arthroplasty of the knew is good the technique devised in the two earlier cases (19 0 and 1921) was used in the case just described and has been followed in all subsequent cases. It contains several original features which diminish the danger of lateral instability and make the carly application of physiotherapy possible.

AUTHOR'S TECHNIQUE

A tourniquet is applied well up on the thigh so as to allow postoperative application of plaster of Paris before the tourniquet is removed

The knee is approached by a U shaped in cusion in the skin and oft parts from the inner and outer aspects downward to just below the tubercle of the tibia. It does not extend up the thigh as does Putti s incision. The concavity is upward. This U incision gives the surgeon absolute uninterrupted.

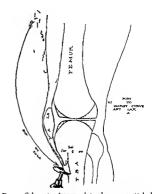


Fig 1 Schematic drawine lateral view sagittal plane showing author's method of turning up the ligamentum patelle ith its bony insertion the patella and the quadriceps tendon. Note modelling of the bony elements of the po

access to all the parts involved in the for mation of the new joint and is therefore distinctly superior to the lateral approach. Also it does not interfere with the important extensor apparatus above the knee as is likely to happen with the inverted U incision or lateral approach.

The technique of arthroplasty should be so designed as to allow passive and active motion at the earliest possible moment without danger of separation of important structures As the free gliding of the soft structures or extensor apparatus just above the knee joint is absolutely essential to free motion and active control the severing and resuture of these structures as in the inverted II in cision is to be avoided for if they are severed not only is there danger of union being in sufficient when one wishes to start exercises and passive motion as early as weeks after operation but because of the cross section severance there is danger of adhesions at this point between the gliding intramuscular and tendinous tissues These considerations lead me to choose an incision which does not section or traumatize these soft structures



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above the knee and to turn the patella up ward rather than downward a advocated by certain authors

When the knee is being opened up care should be taken to leave the skin flap over lying the interior work as thick a possible so that the skin and line of suture will not break down following operation

Before the patella is turned upward the licamentum patella is detached with a gen eron amount of bone from the region of the tibial tubero ity in the dovetail manner in dicated in Figure 1. First two holes for later insertion of kangaroo tendon are drilled one through the tibial tubero ity and one slightly posterior to it. Then by means of the motor saw and smill drill the tubercle of the tibia including one drill hole is removed with the ligamentum patelly and the patelly turned upward This bone plastic work is done very rapidly with the Albee motor saw and be cause of the dovetail mortice conformation and the rapid union of closely fitted broad bone surfaces to bone surfaces the surgeon need not question the detachment of the ligamentum patellx—a question which has been raised by MacAusland who considers it inadvisable to sever or disturb the patellar tendon or its attachment. It is distinctly preferable to detach this tendon as tryin to work around it involves unnecessary trauma to neighboring tissue slows up the operation and limits access to the joint. It is well known that bone unites to hope

more readily and more firmly than tendon to tendon or fascia to fascia The authors method of detaching the ligament takes ad vantage of this the dovetail mortice con formation being a further assurance of prompt union and of the prevention against the pull ing away of the tendon from the tibia even when bony union has not taken place I rompt union obviates delay in the appli cation of postoperative physiotherapy which should follow within 2 weeks after the arthroplasty In marked contrast to this is the union of a severed tendon to tendin which is both slow and unreliable. Puth method of nailing the ligamentum patella and tibial tubercle in place with a double headed nail does not insure as prompt or as firm umon and has all the disadvanta es which attend the introduction of foreign bodies into living tissues. In reviewing the literature I and that Kirschner ha success fully used a method somewhat similar to mine After the ligamentum patell w has been thus detached the soft tissue and capsule are dis ected from the ankylosed joint to which they have become amalgamated and the whole mass-patella quadriceps and oft parts-turned upward exposing completely the anterior and lateral surface of the

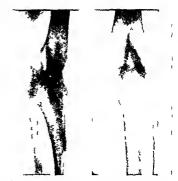
junction of the tibia and femur (Fig. 1) It this juncture the gliding of the lower part of the quadriceDs muscle and its tendon upon the lower end of the femur is tested a well as their length If this tendon and muscle do not glide up and down satisfactorily and are not of sufficient length plastic work should be done to lengthen the tendon as well as to bun, about its satisfactory glidin on the lower end of the femur Thu is a very important feature of the operation becau e if the tendon is not long enough to allow postoperative flexion or if the quadricep tendon is not free seriou interference with postoperative physiotherapy or mobilization of the joint will occur

Severance of the quadriceps tendon or muscle becomes unnecessary when my tech nique is used and this is well since severance necessitates the suture of soft part to soft part fascia to fascia and muscle to muscle thus tending to shorten these structures as well as to delay early physiotherapy by slow union It has been my practice to remove all immobilizing splints at the end of and to institute active and pissive motion If the quadriceps tendon were severed this early postoperative treatment would certainly jeopardize union. Again the severance of the quadriceps muscle and tendon and the dis secting downward of the distal portion serious ly involve the gliding structures above the patella which may not have been damaged or destroyed by the original pathology which produced the ankylosis

After the patella quadriceps and soft parts have been turned upward en masse one is then ready for the bone arthroplasty has been found by Allison and Brooks that it is absolutely impossible to duplicate experi mentally or in surgically constructed joints at the knce the normal gliding of the articular bone surfaces This being true and attempts to approximate the contour of the normal joint being so often followed by lateral in stability it has seemed best to use one's mechanical ingenuity to bring about desirable tunctional results on an entirely different mechanical plan Therefore my technique does not follow the confirmation of the normal knee By making use of well known mechani cal principles I have overcome the disad vantages with respect to lateral instability of an arthroplastic joint modelled after the normal anatomical joint and still obtain adequate mobility

With a broad osteotome parallel broad V shaped incisions with the apex downward are used in modelling the joint anteriorly (Fig. 2)

The lower end of the femur as viewed from its anterior surface is shaped into a wedge with an ingulation of 120 degrees between its plane surfaces. This leaves the tibia with concave plane surfaces at an angle of 120 degrees to each other. These are in turn care fully modelled so as to receive with accurate fit the convex wedge shaped surface of the

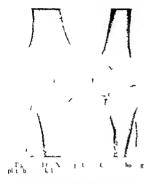


lig 3 (left) Lateral sex show no author m thod of easion to secure arthrodes; in a tuberculous joint lea ing the pat lia miact as w reside that the latter 1 an important tem in a nex formed joint followin arthroplasty. Note strong long aft tibial pegs: siti

Fig 4 Interopo t rior i v of the ame case howing location of stron tibial peg taken from the ame tibia

lower down with the author's motor say

This is one of the original features of the operation and is an effective measure in the avoid ince of lateral instability in that from a mechanical standpoint weight bearing forces the wedge contour of the lower end of femur into the corre ponding wedge shaped cavity of the upper end of tibia. This peculiar contact practically insures stability and con sequently an unusual amount of laxity can be permitted by removal of an ample amount of bone Agenerous amount of bone particularly at the posterior part of the joint is removed from what was the tibia and femur and the remainder is so shaped that it will imitate so far as possible the normal contour of the joint. However even more bone is removed from the posterior condyles at this point Great care should be taken not to leave any blocks of bone attached to soft parts in the popliteal space because of the danger of their acting postoperatively as osteogenetic ma-It must be remembered of course that the removal of too much bone will favor instability but the wedge shaped method just described markedly diminishe this possibility



Creat care should be taken to leave the bony surface as mooth and plane as possible to facilitate gliding This is usually best accomply hed with a sharp (112 inch) osteo tome but a file may be used if necessary \ close study of the conformation of the bony surface of the new joint should be made in order to shape them most favorably for the function of joint motion The proper con formation of the joint should then be tested by flexing the knee to beyond a right andle Free motion without impingement at any point of one surface upon another should be striven for before the free fa cia and fat graft is obtained

The patellar ligament with its dovetail bone fragment is then replaced in the original mortice bed and sutured down by Langaroo tendon through the prepared drill holes

The joint is again flexed very crutiously to at least a right angle to check up on the contours and to insure free excursion of the quadriceps tendon and muscle so that postoper tive physiotherapy will not be prevented from the securing of the desired motion

The joint is then packed with hot saline compresses while a rectangular graft of fascia late and fat is being obtained from the central portion of the outer aspect of the

thigh Being a semifluid substance the fat under pressure after joint closure practically flows into the cavities and absolutely fills up all pen irticular dead spaces thus presenting the formation of hematoma. For this reason the inclusion of fat with the fascial late grift seems to me very valuable and I cannot agree with those who advocate the use of fascial trailing.

If sufficient fat can be obtained with the fascia the superior portion of the graft i plit and the undivided portion placed be tween the tibin and femur. The fascial portion of the split end is turned upward and inserted between the lower end of the femur and the quadriceps tendon and the patella while the fatty portion is turned downward and placed between the upper end of the tibia and li a mentum patella and the patella. The graft is sutured with chromic catgut No 1 to the remains of the capsule and soft tis ue. The remains of the capsule are then sutured medially and laterally with chromic cat ut No 1 and the skin closed with plain catout No o and sterile dressings applied

Moleskin straps are applied medially and Interally to the lower leg for traction to obviate mu cle spasm and consequent injury to the fi cri lata transplant by crushin between joint surface and all o to keep the

bone ends apart Then a cast is applied so constructed as to allow for traction by means of the moleskin The tourniquet is not removed until the plaster applied from below upward ha reached it Certain surgeons remove the tourniquet before they close up the wound I his is to be condemned in that in an arthro plasty there are such broad surfaces of raw bone that the large amount of bone ooze cannot be controlled by ligature observation shows that a larger amount of bleeding will come from the cut bone surfaces than from the small blood vessels which will escape ligature if the tourniquet i left on The compression and immobilizing effect of plaster of Paris with all joint space filled with the fat and fascia graft acts as a marked h emo tatic influence and it is therefore pref erable to leave the tourniquet on thus pre venting the very considerable oozing from the

bone surfaces which would occur were it removed. The hizard of hizardomn is a real one and should be carefully guarded against

A pulley and traction apparatus upon the bed must be ready for immediate application when the patient returns from the operating room. The patient is held completely under the anesthetic until traction of 15 pounds is well established upon the limb. This is done to prevent muscle spasm which is likely to occur as the patient comes out from under the ant thetic and which might cause the approximation of the bone surfaces and the crushing of the fascial ind fat graft between the bone surfaces. The latter might be a real calamity, leading to re ank, lo is

This traction is continued for at least 112 months after the plaster is removed and massage begun. Even after the patient goes home the traction is maintained throughout the night although during the day the patient is allowed to walk with crutches authout aeight bearing the latter not being permitted until at least 2 months after operation

This technique has been followed in the 10 cases which are reported herewith

To clate approximately 500 arthroplastics of the knee have been reported in the literature about one third of these being for bony ankylosis (Table I)

ESSENTIALS IN TECHNIQUE OF ARTHROPLASTY

The essential features in the technique of arthroplasty are (r) approach to the joint () the freeing of the ankylosis (3) thorough eradication of all soft parts which might favor re ankylosis such as pathological neo form tissues synovial debris cartilage fibro cartilage capsule (4) meticulous modelling of the articular surfaces so as to allow free motion and at the same time avoid lateril instability (5) interposition of a tissue cap able of arresting osteogenesis and of maintain ing the separation of the new formed articular plane and at the same time of stimulating a minimum amount of tissue reaction (6) closure of soft parts with care as to apposi tion so that there will be no leakage through the line of suture (7) immobilization with traction and (8) intelligent postoperative physiotherapy



Fir , (left) Rountgenogram following arthropia ty Ca c 2 showing, vide \(\) haped method of remo al of bone an i shaping new formed joint Fi 8 Lateral view following arthroplasty Case showing modelling of joint

A great variety of means are used by differ ent surgeons to attain these fundamentals modifications are made to suit the particular case and experience with postoperative results suggests further modifications such as those in the earlier part of this paper under author's technique. In this connection it is interesting to review briefly the history of arthroplasty and the various methods now in vogue since it cannot be said that there is at present any standard technique for this operation upon the knee

To Verneuil (1863) Ollier (1888) and Helfench (1894) belongs the credit for the original conception of mobilizing ankylosed joints. Their procedure was of the nature of a resection rather than a true arthroplasty. Modern asepsis has made entering the joint and complicated technique less dangerous than in their day. Helfench is credited with the first success with the interposition method. Murphy and Putti have done much to perfect the technique. It is curious that although the idea of arthroplasty is essentially a French idea France has until recently been one of the

most conservative of its advocates, so far as

the knee is concerned

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In 19 t Olher who had obtained very en couraging results from experimental arthro plasties on the knees of animals hesitited to apply to human surgery what he had thu worked out because of the consensus of opinion against such interference. But his own conviction in the matter is expre sed by this question. Is ankylosis in good position the last word in surgical art? Ought we ever to stop trying to attain on the knee what we obtain so routinely on the other joints the shoulder the wrist the elbow.

INDICATIONS AND TECHNIQUE FOR ARTHROPLASTA

Those who have had the widest experience and the greatest success with arthroplasty are unanimous in urging careful selection of patient In so done the followin point should be considered (1) the original cau e of the rinks lo is (1) the position of anklo (flexion extension) had (1) the condition of the patient—not merely the general physical resistance but the psychic octal and occupational factors

The criginal cruse of ankylosis Trauma suppurative arthritis gonorrhea tubercu lo is osteorithriti and rheumatoid arthriti rie the u unl cruses of ankylosis arran ed in order of suitability for arthroplasties

With regard to the advisability of operation upon a case of bony ankalosis due to tuber ulosts there seems to be the greatest differ ence of opinion I believe such joints should be approached with due conservati in but not ne simi m I utti I ever and Henderson con ider it a detinite contra indication apparently base his opinion entirely upon theory i we have not been able to find a tuberculou case in his published sene Hender on ha done an arthropla to on two knee in which ankylosis was of tuberculou origin. Both of the e were operated upon on a mistaken diagno is Neither gave a sati factors re ult Although he doe not advi e arthroplasty in tuberculosis of the knee he has done successful arthroplastic on several case of healed tuberculosis of the elbow joint Murphy considered the progno 1 unfavorable Baer I are and Her Groves con ider the progno is good if the cises are properly selected and I ub cribe to this opinion one of my most brilliant re ults being in a ca e of old tuberculosis

Chevalier believe that in "eneral ince there is no way of proving ab olute cure of tuberculo is it i better to leave such cae you have a certain number of "coof re ult arthroplast; ou, ht not to be ab olutely rejected and is permissible in three in tance (1) In case, which have apparently been cured if the patient insists on arthroplasts () in cases which have apparently been heided for a long time and the knee is anky losed in flexion. If on opening the joint a tuberculous focus or su picious lookin tissue is found in ection can be done and the patient will be as well off as before. If no



Fig to Po toperative view Case howing ode ees

Γιο 11 Show 1 eight lang on n w formed joint Core a dd mon trati lt ral tal bity

lesion is found arthroplasty will give the pritent the chance of gruing mobility. (3) In cases in which arthrodesis has been previously performed. In such cases curved the tuberculosis is most probable and when a raws how that the ankylosed bone has sufficient dimensions to allow for arthroplast, it seems most reasonable to attempt it if the patient so desires. Payr has done the and has tried to make up for the absence of the patiella by special tendinous grafts. Although the results have not always been good Chevalier hinds them distinctly preferable to complete rinks losis.

I am in complete accord with points 1 and 5 but fail to see why and viosis in flexion is a special indication for arthroplasts

In determining the operability of tubercu lous cases, the surgeon finds that careful Y-ray study in several planes and by stereo scopic views serves as a very valuable and trustworthy adjutant in fact X-ray technique has now been so perfected and reveals such excellent detail that if the surgeon make the best of this opportunity in selecting cases and does not undertake arthroplasty until 4 or 2 years after the last symptom has sub-ided he is fairly safe. If in the X-ray there are exidences of rarehed pockets or cavity formation or areas of extreme osteoporo is the case is unfavorable but if the bone tructure appears.

furly uniform arthroplasts should be successful

It is needless to emphasize the fact that improvised tendinous grafts to take the place of the patella are certainly not as desirable as the retention of the patella at the arthrodesis operation for later utilization in arthroplasty

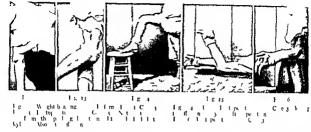
For a long time in a large number of cases I have pre eried the patella as a pedicic graft morti ed or brought it in contact with both tibia and femur to increase osteogenesis and the results have been excellent so far as the arthrode is was concerned. Now since the new concept of preserving the patella for use in a future arthroplasty has appealed to me if the patella is involved in the infection I remove only the small diseased portion the remained robing allowed to remain m situ

In Table II are listed the end results in 24 cales of arthroplasty on tuberculous knees which have been reported in the literature and my case which has already been described and in which the result was excellent. I have also done an arthroplasty in several cases of herded tuberculosis of the hip with good

results

for future utilization

The position of ankilosis Extreme flexion is unfavorable to arthroplasty because it makes the technique very difficult and



nece sitate extensive removal of bone and the acrinic of this portion of the tibra and femin which has the large t diruntur thus tending to produce lateral instability. If the knee is markedly flexed at its advisable to perform a preliminary supracondylar ostetome.

The condition of neighboring joints should be considered. If both knee are anky losed arthroplasts on one is definitely in dicated or if the knee and hip on the ame side are ankylosed there hould be slight reason for hesitation.

Fo women the awkwardness of ankylosis is more annowing than to men and in young women inkylosis often proves a distinct handicip socially. For both mun and women the nature of their profession or occupation will often determine how essential mobility of the knee is to them

In eyears ago I would have said that anky lot in extension was best left alone but in yow of the constantly improving re ults from arthroplasty. I believe that the patient should be given the benefit of the latter unless there are definite contributions.

Co operation of the pitient. In few operations is the shoulte co operation of the patient so e entire is in arthrophisty of the knee However perfectly the technique may be obtained unless the patient submits with patience courage and intelligence to the long postoperative treatment which is likely to be but painful in the first stages and is always at it. It is wise to test the patients

nervou stability by telling him thi in advance and to let his reaction to such a state ment be an indication for or abunst the operation

MI persons of weak will those of exces ne nervous instability and those who have a hitgation interest in not getting better such as certain compensation and accident cases must be eliminated if the surgeon does not wish to Tisk Junice a Trailures

lige and ex are not vital factors althou he patients under it very are sometimes difficult to manage after operation and those over 50 years have not the ame degree of resit ance. It has been stated by some authors that men are more favorable subjects than women but this has not been my experience.

Incision The inci ion should satisfy two conditions (i) give free access to the mot remote corner of the joint so that it may be meticulously modelled and bony debrachend out and (2) pire erve the justicanticular elements particularly the extensor appraistus above the knee which is so important for future active mobility and stability.

Three types of incision are to be considered (1) the literal incisions used by Murphy and Baer (2) the U incision with concavity downward and the inverted U inci ion with concavity upward The literal incisions avoid severance of the quadricep but do not afford free access to the joint particularly to the pophiteal space are upt to lead to necrous of the soft parts due to the trauma from difficult instrumental retraction and becau e

of the severing or traumatizing of the soft parts above the knee may impair the extensor apparatus which is so essential to motion Murphy for a time abandoned this method for the U incision but later returned to the lateral incisions They are now rarely used except by Bacr

The inverted U incision advocated by several authors including Putti and popular in France is also objectionable in that it severs the extensor apparatus lying above the joint entails suture of these soft parts and the possibility of slow union which will delay postoperative physiotherapy and further adhesions in this location will interfere with the free gliding of the extensor apparatus which is as important as motion in the joint ıtself

The U incision with concavity upward is the incision of choice since it affords free access to the joint and does not disturb the important extensor apparatus above it and especially since the only objection to this in cision can be removed by the simple dovetail osteoplastic method of turning upward the ligamentum patellæ as employed by the author

Treatment of the quadriceps In many in stances that part of the knee joint which extends above and posterior to the quadriceps tendon has not been seriously diseased and the quadriceps tendon and muscle are neither shortened nor adherent to the lower end of the femur In this event the excursion of the extensor apparatus is sufficiently intact so that no plastic work is necessary In the event however of adhesions scar tissue or shorten ing of the quadriceps tendon and muscle they must be overcome by plastic methods and lastly it may entail the implantation of an extensive fat and fascia graft between the quadriceps tendon and femur

If my method of approach is used it is not necessary to lengthen the quadriceps rou tinely and I recommend against it as it in terferes with the extensor apparatus

Treatment of the ligamentum patella This point has already been discussed in detail under Authors technique The cutting of the ligament and later the suturing of it as done by some surgeons has obvious serious

TABLE II -- END RESULTS OF ARTHROPLASTY ON BONY ANKYLOSED KNEES OF TUBER CULOUS ORIGIN

A tho	С	R lts
Albee	1	Excellent 90 active flexion full active exten ion lateral in stability
Bacr	1	Good 55
(6 on fibrous an Lylosis of tu berculosi or		
ıgın)		(o to 75 motion)
Ceballos	2	1 good result
Delbet	1	r fistula and re ankylosis Patient did not co operate failure
Dicl	1	Improved
Le l'ort	r	Good
Henderson	2	Unsatı factory
Hintz	1	Unsatisfactory
Hubscher	x	Patella mobile 30 flexion
In ebn sten	T	Good
Lenche		r good
2-011100		I sh ht lateral mobility some re
		traction of quadriceps
Payr		s fle ion
• ···y ·		Excellent (80 to 90 flexion)
Putta	٥	Dicement (or to go he non)
Roth	•	I satisfactory Can get on tramway
Roth		1-at end of 3 months 60 passive
		flexion 40 active
Serada		a after operation good mobility
Sciada		but genu valgum developed
		which was treated by immobil
		which was treated by minious

Good Total 24 21 good results

3

Failure

Tubby

Wieting

Campbell Putti and Lexer consider tuberculosis a definit contra indication to arthroplasty. Murphy an un favorable factor but not a contra indication Hender son advi es great con ervatism. Payr and Baer consider healed tuberculous ca e properly selected favorable The author concurs with the latter opinion

z failure-suppuration

ization When apparatus was

removed knee was re ankylosed

disadvantages in that the union of tendon to tendon is at best slow and not always firm If the tibial tuberosity is taken with the lift a ment the means of fixing it in place after it has been reimplanted have usually involved the use of foreign bodies such as nails or screws which are ill advised. The author's method of dovetail cabinet makers fit made possible by motor instruments has already been described This method requires no foreign bodies for fivation purposes and in sures early union Although I worked out this method independently. I find on review ing the literature that Kirschner proposed in 1910 a similar method The criticism has been

made in the literature that by Kirschner's method the mortising may not be sufficiently accurate or firm and a fracture or pulling away may occur during the postoperative treatment With the use of the motor saw drill and gigh saw this possibility is entirely elim mated for the work can be done quickly and easily and the cabinet maker's done tailed fit assures firm attachment or union before postoperative treatment is begun method is strongly recommended as being distinctly preferable to the alternative-sectioning the quadricens

Freeing of the patella With the chisel the patella is detached from the femur the procedures described in the literature varying with the type of skin incision balf from with out and half from within if two lateral in cisions are used from below upward if the U incision is used, and from above downward in Putti s new procedure the inverted U in cision. Ceballos vertical hemisection of the patella and quadriceps is rather too com plicated as the instruments must be inserted through the breach in the quadricens advocate turning the patella upward because this does not traumatize the extensor appar atus above the patella

Cleaning of the freed roint must be most painstaking with removal of all fibrous ele ments. In old bony anky loses often no vestige of the menisci is found nor of the crucial ligaments which have become absorbed in the ankylosis The capsule pre ents itself as an indistinct and adherent mass The lateral ligaments may exist as cords or bands very difficult to isolate Very often they are short ened and if not sacrificed during the breaking up of the ankylosis they limit the separation Many authors notably of the surfaces Only, and Ceballos recommend preserving them Others considering that they oppose thorough exploration particularly of the pop liteal space resect them more or less com pletely if not entirely. Knowing the importance of these ligaments as regards stability of the joint one seems crught in a dilemma either the ligaments must be sacrificed to make a complete exposure and to obviate the possibility of reankylosis with the risk that lateral mobility be taken or in order to

insure stability the ligaments may be pre served at any price with the dan er that condular bony bridges or fibrous masses re muning in the popliteal space may induce shortening and favor reankylosis chooses a medium course he divides the ligaments after freeing them from all cicatri cial tissue The anterior half is detached from the tibia the posterior from the femur Both are then turned toward their insertion and detached from the adjacent meniscus

I believe that it is not best to lay down any rule but to conserve the ligaments whenever possible If necessary however one should not he state to sacrifice them in order to et a good exposure particularly as the concave and convex wedge shaped modelling of the tibia and femur will practically insure stability If the lateral approach is used the lateral ligaments may undoubtedly interfere with adequate exposure but with the U incision which I use as do several other surgeons they can usually be entirely preserved and sufficient bone removed to allow free motion and adequate space to receive the grait implantation

Modelling the osscous surfaces very important stage of the operation Most

authors recommend imitating the normal joint contour so far as possible at once sim plifying and exaggerating it and also takin care that the transverse diameter is not made too short as this will interfere with stability Payr makes a convex concave modeling I centimeter deep in the center and from 2 to

5 centimeters in front and in back. That is to say the convex inferior extremity of the femur will have a smaller radius than the concave superior extremity of the tibia. He also hollows out a deep groove for the patella so that its shoulder impinging on the ed er of this assures lateral stability of the joint

I largely ignore the normal contour and use the convex and concave wide I shaped modelling already described which has as forded satisfactory mobility and lateral sta bility in every case

Those who attempt to approximate the contour of the normal joint use curved in struments but for the wedge shaped modellin the ordinary broad osteotome is used Inas

much as this technique works along straight lines rather than complicated curved ones it

is simpler to execute

Various methods for securing lateral stahility are suggested in the literature pre er vation of the maximum transverse diameter of the epiphyses painstaking care to insure a perfect fit of the articular surfaces If it is remembered that in the normal knee con gruence hetween the hony surfaces does not exist but is effected only by the inbrocarti laginous menisces and that these have been destroyed or absorbed by the ankylo is or extirpated by the surgeon we readily realize that it is necessary to establish hetween the hony surfaces themselve a most perfect fit If an attempt to imitate the normal contour is made the femoral condyle and the corre sponding tibial surface should be modelled with the same gouge to assure a similar curve (Putti s method) One tibial surface may be separated from the other by an anteropos terior ridge opposite which a deep groove is hollowed out between the condyles To facili tate gliding movements in the nearthrosis it bas been sugge ted that the anteropo terior diameter of the condyles be diminished and their po terior projection shortened parti cularly the condyles of the femur which might form bone block to flexion

Whether the author's wide V shaped model ling or the more complicated attempt to imitate the normal is u ed accuracy of fit and wide diameters are essential to success. Ar throplasty is by no mean an easy operation and should he attempted only by tho e

skilled in bone surgery

The patella frequently hypertrophied and often to enormous proportions must be reduced sometimes to one half its ize. Its posterior surface is conformed like a donkey shack. Cunco helieves that reduction in the size of the patella is a means of getting a certain laxity of the patella-quadricipital apparatus.

The material for interposition. The evolution of the material used for interposition is interesting—from the early use of foreign bodies to the present introduction of organic tissue, the most favored heing free autogenous favoral lata and fat grafts. The inadvisability of using

foreign bodies was discovered when the tech inque of arthroplasties in other joints was being developed. A variety of substances such as wood gold aluminum iodoform gauze par affin gummed taffeta celluloid silver rubher and hatiste had heen employed. The harder materials hecame fragmented or displaced the pliahle ones winkled and folded and all were a frequent source of infection.

Then Murphy introduced the use of the pedicled flap of fascia and fat and from this has gradually come the free fascia and fat flap taken from the thigh either of the same or the opposite leg In arthroplasts of the knee the pedicled graft is many times not favorable material in that it may contain some scar tissue or some of the old inflam matory process. Also the pedicle produces unfavorable conditions where it comes through the pemphery of the joint MacAusland rec ommends taking the graft from the opposite leg and I believe that the point is well taken in that it eliminates trauma to the soft tissues above the knee the importance of which in function has already been empha ized

Baer uses the submucosa of the pig s bladder specially prepared and known as Baer's membrane Whereas he bas reported good results from this method in fibrous anky losis they are not good for bony ankylosis Other surgeons who baye tried the method

report many failures

Allı on and Brooks experimented with Cargyle's membrane free fascia from the fascia lata pedunculated fascia flaps chromi cized pig's hladder (Baer) and fascia im pregnated with silver to determine the possibility of the interposed substance healing in the length of time it may persist the amount of reaction it produces and its efficiency as a factor in the restoration of an anatomical articulation. It was found that Cargyle's membrane persisted hetween the opposed joint surfaces only for a few days and did not prevent the adhesion of the opposed joint surfaces Chromicized pig s bladder persisted for a longer time hut the reaction of the surrounding tissues was of such intensity that even at the time the membrane was disintegrating there were adhesions he tween the granulating surfaces

Allison and Brooks recommend the use of silver impregnated fascia since they found that this prevented the union of the denuded joint surfaces better than did free fascia, and did not cause any marked local reaction But silver is a foreign body and will stimulate tissue reaction Nature's effort either to encapsulate it or to throw it off means over production of tissue which is exactly what is not de tred In arthroplasty there should be the least possible amount of tissue reaction The inclusion of fat with the fascia certainly the living autogenous fascia and fat graft unimpregnated stimulates less reaction than anything else possibly could this is a funda mental

Certain essentials must be met by the material of interposition if the arthroplasty is to be satisfactory (1) it must be re istant to puncture (2) if possible it should be of semi fluid con istency and sufficiently thick at certain points to fill all the crevices in the new formed joint (3) it must be phable so that it will adapt itself to the contours of the joint (4) it must set up a minimum of tissue reaction since such reaction is likely to de velop into adhesions or exce ive exudate with the possibility of establishing a sinus outward (s) it should remain unabsorbed for 20 to 40 days in order to limit osteogenesis and (6) it must be sterile

In meeting these requirements the autog enous fascia and fat graft stands out in a class by itself The first two requirements are especially fulfilled by the combination of fascia lata and fat in that the dense tough fascia lata resists puncture or penetration from bone pressure immediately following operation when the patient's muscles go into involuntary spasm and also later during postoperative physiotherapy The fat being semi fluid answers the second requirement as fascia lata alone cannot do It is for this reason that I firmly believe that fat should be included in the graft

On e the craft is in place it is attached to the periosteum and to the adjacent structures by a continuous suture of No 1 chromic cat gut

Closure The closure of the joint should be meticulous Care should be taken to leave

the skin flap overlying interior work as thick as possible continuous suture of No 1 chrome catgut being used to close the subcutaneous tissues and continuous suture of No 1 plan catgut for the skin the object bein to get immediate union and a sufficient thickness of tissue at the line of suture so that it will not break down following the operation The tourniquet should be left on until the plaster cast has been applied from below up to it This method of guarding against the forma tion of hematomata has already been dis cussed under Author's technique

Postoperati e traction aeight bearing and bhysiothera by Continuous traction on the new joint and early voluntary movements are the essentials of after treatment. As has al reads been stated the traction is continued for at least 112 months after the plaster is removed and is maintained at nights after the patient begins to walk with crutches but without weight bearing. Weight bearin is not permitted until at least months after

the operation

The first difficulty which the physiother thist has to overcome is fear on the part of the patient The parts involved in the post operative treatment are so extensive and the muscles so powerful that if these are in a state of spasm the physiotherapist can make no progress Obviously every particle of fear must be allayed in order to relieve this spasm Since the absolute confidence of the patient is the fir t step gentleness must be used at first but not too long for unless rapid pro ress is made adhesions may develop and senously retard if not impur the end result For that reason consistent work to ordinating the mental with the physical should be carried on daily for the first 4 weeks at lea t Patients are sent home from these treatments with the feeling that use is not joing to pro duce pain but with instructions to give the joint perfect rest between treatments at fir to use hot applications or sit in a hot tub soon after they get home A little later they are taught hou to do supplementary ma sa e at home between treatments then to har the leg over the edge of the bed and finally to use it but not to the extent of producin pain

SECONDAP'S OPER STIONS

If at the end of 3 to 6 months lateral mobility persists Hey Groves recommends a second operation to reinforce lateral ligaments. This his not been found necessary with the author's technique as in every cive the joint has had most satisfactory lateral stability. But I have in several cases done secondary operations to sever restricting bands of fascia or scar tissue lateral to or above the patella which were limiting mobility and the results have been excellent (Cases 2 3 and 7)

These operations have varied in degree from a short incision and the severance of a small band or two of fascia or connective tissue to an extensive operation where even the new formed joint has been unintentionally entered and extensive soft parts severed

We believe that this is a rather radical step that has not been practiced by other men and personally I feel very enthusiastic about secondary operations to overcome tissue contractures interfering with motion Case 2 (M K) is a striking example of what may be accomplished by secondary operation

PLANNING ARTHRODESIS WITH VIEW TO FUTURE ARTHROPLASTY

Arthroplastic operations on the linee are becoming so satisfactory and the prognosis so favorable that one should certainly plan arthrodeses so that a future arthroplasty for mobility may be done under as favorable conditions as possible. For whitever cause an arthrodesis may be undertiken it is important that the patella be left in situ in the quadriceps tendon because of the possibility of future arthroplasty.

Roentgenograms (Figs 3 and 4) are shown of 1 typical case illustrating the 1 thors method of arthrodesis which is so planned as to establish the best condition for a future arthroplasty Case 3 (EF) is a striking example of the wisdom of such a procedure as the patient returned several years later with an urgent request for arthroplasty

EVOLUTION OF NEARTHROSES

If it is true that a knee which at the end of 3 months has a mobility of 30 degrees will go

on increasing the degree of excursion it is certain that an excised capsule reforms and with it ligamentous cords reform at useful points it must be emphasized that all these processes progress extremely slowly. The nearthrosis is formed in the midst of surrounding tissues just is the normal joint is formed in the mesenchyma of the embryo. If this genesis is slow in embryonic tissues, it is even slower in the completely evoluted tissues of the adult. Sudhoff had the opportunity to examine an elbow operated on 2 years before by Payr. He found histological phenomena showing that the articular tissues bad not yet reached a stable definite structure.

Pun does not usually persist after the first series of postoperative treatment. Soon the epiphyses correctly modelled become pain less

The motor muscles gradually regain their ability to contract even if they have been inactive for years. The refleves re appear. The different types of sensation—superficial and deep barasthesia and sensation of position—are at length re established as in a normal knee.

The nearthroses possess still another char acteristic once established—they are never the seat of effusion or of swelling. They seem to be resistant to all hæmatogenous arthritic processes. One of Payr's patients a cavalry officer of the late war fell from an aeroplane and his leg was immobilized for several months for an infected fracture of the femur on the side operated upon yet the arthro plastic knee retained all its mobility.

The artificial joint created by the surgeon to relieve ankylosis is by no means a normal joint. It suffices that there is a joint which functions well

RADIOGRAPHIC APPEARANCE

From the point of view of radiography a knee which has been mobilized by arthroplasty for some time has a strong resemblance to chrome arthritis the surfaces are not exactly plane nor is the interline exactly plane nor is the interline exactly plane from formations are frequently observed in the cavity. However proliferative phenomena are not always lacking. Their appearance as in a case of Mauclaire in which

osteophytes arose on the borders of the interline determined re ankylosis

METROTHERAPY

During the postoperative treatment it is often encouraging to the patient to let him observe the progress of function by means of metrotherapy apparatus described by Gilli land and the author in 1020 Metrotherapy is a means of demonstrating to the patient just what effect treatment is producing By means of accurate measurements of the am plitude strength and rapidity of voluntary movement of the impaired joint the patient is shown the nature and the rate of his re covery One of its greatest values lies in its psychologic effect on the man in interesting him in the progress of his own case. Even a small gain is most encouraging and the patient is urged to try to beat his former records These factors induce a maximum of voluntary effort and create a healthy interest in the mind of the patient

SUMMARY

The prognosis for arthroplasts of the linee to relieve bony ankylosis has distinctly im proved owing to refinements of technique and a better understanding of the indications and selection of cases The author presents certain original features notably a wedge shaped modelling of the joint which elimi nates the danger of lateral stability and yet affords adequate mobility Tuberculosis is not necessarily a contra indication if the infection has been quiescent for a number of years Such cases should be approached with conservatism but not with pessimism and careful I ray studies are helpful in making the final decision In arthroplasty the steps following operation are almost as important as the surgery Without them and without the full co operation of the patient a perfect surgical operation may be followed by a functional tailure Ten cases which were operated on by the author with good functional result are reported

Arthroplasty of the knee has as yet no standard technique It is still an open chap ter in joint surgery and one which offers much promise Although the prognosis has definitely in proved the operation is by no means an eas, one and should be attempted only by the skilled in bone plastic surgery and thoroughly familiar with the principles governing after care.

AUTHOR S CASES

CASE I Mr R E aged IS years The patient had a double mastoid with very virulent strepto-coccus infection and dis ection was made even as far forward as under the muscle planes of h size on one side. This was follo ed by a metastatic in fection in the knee joint of a very severe suppurative type. Repeated aspirations were earned on to no avail. I fact the septic process increased in virulence. Extensive draining laterally on both sets was instituted but still without control of the infection.

An uncle was immunized with vaccines from the cultures made from the patient kine and the patient was transfused from the uncle on itse occasions with a very satisfactory result. The suppuration of the kine gradually subsided and finally healed but it left the point completely analysised to extension with bony union of this to femur and femur to practile.

Arthrophasty by means of the technique already described was performed July 12 9 Dressing vere rum of drugut 130 September 3 the wound was entirely healed and the patient had 13 degrees of active the ion \tay pictures showed a still factory new formed joint Weights at night we continued and no wight bearing permitted by massage and graded exercises begu. October 3 moton was still increa ing and after a fortille manipulation under anæsthe ia to break and severestri t g hands the progress was uneventiful.

At pre ent there is 85 degree of active flexion.

Function is most sati factory s shown by the fact
th t the pati nt has r cently won a swimming race
and enjo s other athletic pursuits

CASE Mss E F 17 years of age At 17 mo this the patient fell from her chair and the right knee beer me stiff following this are de that the ag of sh was brought to the autho because of pan and st finess in this lines which had prevously been treated clsewher by plast reast and braces

X ray exami at on revealed a tuberculous p oc ess with extens we destruction of the joint Arthro de is was performed by the author in October 19

with the knee in 10 to 15 degrees of fle too. Following this operation the patent and her patents made repeated and per 1 tent reque \$10 at 90 pt 4 much against h 8 own de re and jud ment the author did an arthr plasty and applied traction as described under technique. Except for a sight discharge from superficial structure 3 the recorfy was uneventful and massage and exercises were

begun traction being continued until 2 months after operation. In the latter part of August the patient bad slight motion and this consistently in ereased until in December the result was good ex cept for some limitation of motion which seemed to be due to adhesions

In February 1925 the knee was manipulated under gas to break up adhesions around the natella and this manipulation was repeated in May Ex ercises and massage were continued until the excel lent result shown in Figures o 10 and rr was ob tained From the beginning there had been no

lateral instability

In September 1927 the patient who had bad 80 degrees of active flexion for some time bappened to meet another of my patients who had a slightly superior result and she requested a secondary operation As she expressed it she felt some restriction at the inner aspect of the joint which she was not conscious of on the outer aspect and believed if this restriction could be overcome she

would baye a perfect result

This secondary operation was done September 19 1927 and consisted of parallel skin incisions on either side of the quadriceps tendon just above the patella and severance of nll soft structures which were restricting flexion. The new formed joint was uniatentionally entered at the outer incision but by dissecting up the new formed capsule or joint mem brane it was possible to secure n favorable closure Fat tissue was dissected away from beneath the skin on the outer side of the outer incision and on the inside of the inner incision and drawn into the clefts made while the leg was in extreme flexion The skin was closed in the usual manner

The knee was put up in flexion of 110 degrees and that position maintained in plaster for one week after which the cast was removed and 15 pounds of traction applied to bring the leg into full extension again Massage and exercises were begun at this time but traction at night continued Later the patient was allowed to walk with crutches without weight bearing. At the present writing the patient is bearing weight walking without cane or crutch

CASE 3 Miss M K 18 years of age Patient had bony ankylosis of the right knee following a pronounced ostcomyclitis of 3 years duration The wound healed for 2 months when patient con sulted author in December 1925 The Lnee was fix d in 10 degrees of flexion Arthroplasty was performed December 15 1925 and traction applied Recovery was uneventful Massage and exercises were begun February 8 ro26 March ro ro26 the knee was manipulated under gas to a right angle of motion This was repeated in August

Although mobility constantly increased there still seemed to he constricting hands which pre vented the patient from getting complete mobility Therefore on January 19 1927 a secondary open operation was performed and all soft parts and fascia lateral to the quadriceps tendon which were restricting flexion were severed. The knee was put up in plaster in 120 degrees of flexion for one week The plaster was then removed and ro pounds of traction was applied to straighten the limb Later massage and exercises were begun and gradually weight hearing permitted

In November 1927 the result was excellent active extension was practically normal there was active flexion of os degrees and no lateral insta

bility (Figures 12 to 16)

CASE 4 Mrs D L 33 years of age In July 1020 after recovery from typhoid the patient fell and injured her right knee. A cast was applied for months and when the cast was removed there was complete bony ankylosis. The patient insisted on arthroplasty which was performed March 20 102r When last seen the progress was very satis factory but we are unable to determine the ultimate result as a follow up letter was returned

Casr 5 Mr D H 43 years of age This is a case nrthroplasty The right knee was injured of nrthroplasty in an nutomobile accident and was put up in a cast for a weeks Eight weeks after the accident open drainage of the joint was instituted and a cast applied in a right angle of flexion for 12 days. The patient consulted the author one year after the accident on account of bony ankylosis in full exten sion Arthroplasty was performed in February

A letter from the nationt October 31 1027 reads I have more than a right angle of flexion and the extension is about normal. There is nothing in my walk to indicate there ever was anything wrong I ride horseback play tennis and in every other way lead a normal physical life

CASE 6 Mr J W C 36 years of age was in jured in an automobile accident and subsequently had n pyæmic infection of the knee joint. Three open operations had been performed resulting in complete bony ankylosis in 15 to 20 degrees of flexion

The patient consulted the author August 24 1926 and arthroplasty was performed September 30 The end result was satisfactory active exten sion was practically normal active flexion to 85 degrees and there was no lateral instability

CASE 7 Miss A W 23 years of age An acute osteomyelitis of the left tibia with metastatic in fection to hip knee and ankle lead to complete hony ankylosis of the hip and knee and partial or fibrous ankylosis of the ankle The knee was anky

losed in from 50 to 20 degrees flexion

When the patient consulted the nuthor the anky losis had existed for 3 years. Arthroplasty was per formed February rr 19 6 and traction was im mediately applied Postoperative treatment as described was carried out Manipulation under gas was carried out April 17 1926 to increase the range of motion June 7 1926 a secondary operation was performed to sever a band of fascia which was restricting motion The patient now has 80 degrees of active flexion normal active extension and lateral stability

This case as well as Cases 1 and 3 illustrates the possibilities of secondary operation

CAST 8 Miss H S 24 years of age The left hance vas hadly cut and bruis d in an automobile accident with subsequ int suppurate arthritis which r sulted in compile to bony unkylosi in 20 degrees of fie ion. The pri ent hell been strongly advised agrants arthroplasty by a will kno northopedic surg on. She consulted th author is months after the acident and as their seemed to be no contra indi autons and the patient fully realized the seriousness of the operation and its sired it for both social and professional reasons arthroplasty was performed it one. September 8 o 7 At the time of writing Dee mbur in three is 7g digrees of active fie io 1 and motion is still incr as ingivery sat sfactorily.

Case o Mr V K ag d 3 v ars Follo 1 g an attack of gon riner a 4 vears pravious Complete bons ankylosis of the patella to the condvikes of the femur developed The Ance had b nt raced with baking and massag. We the time of the authors examination the kee was fine d on 10 to 13 d gr cs of fixion and w s punful on excess e wight beam g I Januars 1 4 a thropia to 1 flow the techniqued s m bd for the otle case s lut e n sated of the chis ling up of the pat lia from the condyles the usual manner and the implication of a graft of fasta lata and fat The end ult as

good

CASE TO MISS C. L. 48 yet is of ag. 1n 1 lection following an injury in an automobil ac id: tied to complete bony ankilosi of the right k. ce in 15 degrees of flevio. Open de inag. hal ben instituted of days after the acc dn T. Th patie t

consulted the author one year after the actident and arthroplasty was performed November 6 to 200 by the technique described. The result in this case is not as striking as in the others reported but the patient gets about satt factorily. She has 60 degrees of active flevion adequate active extension and no lateral instability.

REIFRENCES

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AUTOTRANSPLANTATION OF ENDOMETRIUM IN THE EXE OF RABBITS

By EDWARD ALLIN M D FACS AND CARL P BAUER M D CHICAGO
F mth D p tm t f Obtt d Gyn l gy R h M d 1C fl g Cheg

AUTOTRANSPLANTATION of endo metrium in the ordinary liboratory, animals lends itself to many interesting and instructive problems as applied to the human female. Interpretation of some of the results are however more difficult because of differences in the cyclic changes of cestrus and menstruation as well as in the structure of the endometrium itself. Many investigations have shown the comparative case with which endometrial tissue will take when transplanted to distant points in the abdominal cavity.

Following the advancement of the now widely accepted transplantation theory of Sampson (10) his co worker Jacobson (6) reported the production of epithelium lined cysts by autotransplantation of bits of endo metrium into different places in the pelvis and abdominal cavity of rabbits. Later Jacobson (7) repeated this work using monkeys in this series the survival of the implant was not quite so constant but the bleeding which occurred in at least one of these endometrium like cysts seemed to be very much like that occurring in similar growths in women

Several years before Jacobsons work Stilling (11) also working with rabbits was able consistently to implant pieces of vagina uterus and endometrium into the spleen and produce cysts of various sizes which were lined with chiated columnia epithelium. These cysts contained secretion under tension yet the epithelium often piled up in papillary outgrowths. The will of these cysts would also regenerate after a piece had been removed for section.

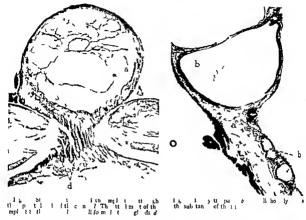
Hesselberg Kerwin and Loeb (5) transplanted kidney thyroid uterus and endome trium in guinea pigs. They found that about 3 days after implantation regeneration of the cells which had become necrotic since removal began and at 5 days a firm attachment to the host had occurred. This attached tissue formed cysts with a retention of the

uterine epithelium but little of the uterine musculiture. Mitotic figures were much more common in the uterine epithelial cells than in the kidney and thyroid tissue indicating that the epithelium of the endome trium was more responsive to proliferative stimuli

The experimental work of Bykon (1) in which he transplanted the entire uterus of young dogs to the omentum would also in dicate that the endometrium has greater tendencies of proliferation than the uterine muscle or its supporting connective tissue. In the 4 animals which he used in this work the transplanted uterus showed a develop ment into the adult type of cell but only the endometrium exposed by amputation revealed a tendency to active proliferation.

O Keefe and Crossen (9) report 3 successful implantations in a senes of ro dogs. All of these implants were transferred to the region of the appendix except one which was introduced into the ovary. The most character istic finding in this group seemed to be the dense adhesions formed about the implantation site. This is also a constant finding in the ectopic endometrial growths in women.

Much discussion has arisen concerning the advisability of castration in the treatment of advanced human endometriosis. The work of Latz and Szenes (8) would indicate that the proliferation of epithelium and cyst forma tion at least in these transplanted bits of endometrium is dependent on ovarian func tion It occurred to us that further observa tions might be made if we could implant pieces of endometrium in a location where the changes from day to day could be ob served The anterior chamber of the eye seemed to fill most of these requirements viz visibility circulation fixation and the ease with which the implant could be recovered for microscopic study Not only is the vascu larization of the eye sufficient but just as soon as the tissue is slipped beneath the



corner it is bathed in a circulating fluid that hould maintain vitality and promote growth

MI THOD

In this experiment 5 ribbit were used Under ether in 18th 11 to ibdomen was opened by a midline incision. Small portions or all of the uten were removed placed in warm normal all oldution and is soon as possible small piece, were implanted in the anterior chamber of each eye. Small lists of testicular tissue were implanted in the eyes of 4 of these ribbit for a comparative check, on growth and reaction. With a little practice we found that we could readily insert pieces up to the size of a split per. Uter the abomen will closed a small piece of tissue was implanted in the abdominal incision of each animal.

The even were first prepared by clipping the lid hair short with ordinary finger nail secsions. A drap of mercurochrome dropped into each eve furnished enough fluid for the easy handling of the implant. With the even

fixed and slightly rotated an incision was made through the cornea at the limbus with an ordinary criterict kinfe. Sufficient fluid usually escaped so that the intra ocular tension was decreased enough to allow the implant to be easily inserted into the antenor chamber on the end of a blunt eye patula. In the beginning we closed the lids by a sin le interrupted suture for the first 48 hours but later better results were obtained by leavant the eye open without any form of dres in

PESULTS

No attempt will be made to describe the the separate animals except those that showed unusual conditions. We shall try to give a composite picture of the course of growth gross and microscopic pathology of this group of specimens and the conclusions we draw from them.

A successful take was obtained in 44 of the 50 eyes. The eyes were either enucleated separately or when the last one was to be

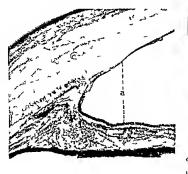


Fig 3 The ciliated columnar epithelium a can be en spreading outward over the anterior surface of the iris b and extendin on to the posterior surface of the cornea c

removed the animal was killed with ether and an autopsy performed. The eyes were fixed in Zenker's solution and sectioned in celloidin. The time of removal varied from 2 to 14 months.

In from r to 24 hours after the tissue was implanted in the anterior chamber the eye showed a marked reaction as from a foreign body. There was a profuse secretion. The conjunctiva was congested and photophobia seemed to be present A marked congestion of all the vessels at the limbus took place. In about half the eyes the fluid of the anterior chamber became somewhat turbid. Usually this acute reaction had subsided by the sixth or eighth day. Definite dilated blood vessels could now be seen centering about and entering into the substance of the implant.

During the next 2 or 3 weeks there was a gradually increasing keratoconus and glui coma in about 90 per cent of all the eyes con taining uterine tissue. This keratoconus sometimes reached surprising proportions. In a few of the eyes the intra ocular pressure became so pronounced that the cornea broke down at its apex ulcerated and the eye had to be enucleated to prevent infection. In one case (Fig. 1) the implant with the insattached was forced through the break in the cornea.



Fig. 4 (left) The invading glands a are shown here quite definitely deep in the stroma of the iris b. Fig. 5. Epithelial lined glands a in this section appear in the ubstance of the cornea b.

During the next 4 weeks changes were noted which we were able to interpret only after some of the eyes had been sectioned. The most common finding was the appear ance of cystic spaces varying from pinhead size to about 5 millimeters in diameter. The microscopic structure of these epithelium lined cystis is well illustrated in Tigure. These cystic collections did not seem to in crease in size or cause any abnormal reaction.

Less frequently we noticed a patchy deep ening of the pigmentation of the iris These thickened durkened areas spread from the base of the implant outward in irregular patterns Microscopically these areas seemed to correspond with the active layer of epi thehal cells which had covered over the anterior surface of the iris from the pupil to the angle with the corner (Fig. 3) This epithelium was directly continuous with and similar to that covering and contained in the glands of the transplant. In those portions nearest the implant it was high columnar and chated At the penphery the cells were more often cuboidal In many places bud ding or bleb formation was present as if cilia were being formed

Many times this epithelium seemed to have a tendency toward the formation of clandular structures resembling the original endome trial glands. Most often this occurred on the antenor surface of the ins. In only a few



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in tances did the egl and like tructure appear
to be invaling the troma of the in (light and a). That the course probable not an

and 4) That the ewere probable not in vaginations of the epithelium following itregularities of the urface of the received to be indicated by the beginning of the formation of like spaces in the mooth under surface of the corner (Fig. 5). Outto frequently gland like mechanisms were present in the ingle of the antiener chamber (Fig. 6). However these were most probably formed by the attachment of the irr to the under urface of the corner of the probably formed by the other corner of the irr to the under urface of the corner.

I ischer (4) and I beling (5) have shown experimentally in tissue culture that epithe hum has the ability to form a deheate con tinuous laver over the surface of artificial media. Thei were also able to demonstrate that epithelial cells have the property of assuming tubular arrangements which resemble glands.

In human endometriosis the question all ways confronts us as to the origin of the stroma which is found surrounding the islands of ectopic endometral glands. It would seem that since the stroma of the endometrium is vital embryonic connective tissue its rate of growth or at least its proliferative tendencies would be greater than that of epithchal cells under the same conditions. In tissue culture Carrel () has shown that under given surroundings therolastic proliferate much more rapidly and eventually will even stop

the growth of epithelial cells when grown in mixed culture. We were not able to identian prohiferative tendency of the endomental strom or uterine musculature in any of the epithelial strom or uterine musculature in any of the epithelial strom although relitively large amount of both were contained in all of these in plants. It certainly would not seem that the stromal cells are a re-pone to the ectopic pre-ence of misplaced epithelial cells of the torontal cells them elves have sufficient prohiferative tendency to follow alon with the outward extension of the critical intervals.

In of these rubbits that became pre mant subsequently to the implantation we observed changes in the ectopic tis ue which resemble those found in a section of the decidual vera (Figs. 7 and 6). There seems to be a delimit suching and ardima of the stromal cells. The gland are more tortious clonested and abundant.

The fret that the epithelium lined ast mentione I did not increase in size would in dicate a lack of secretory activity on the part of the epithelium. On the other hand the uniform increase in the intra ocular pre sure with the resultant Leratocomia would a gest the possibility of secretory activity. Interference with equilibration of pre ure through the card of Schlemm by mean of the preading, epithelium may be the more simple explimition and it so might offer material for study in the production of experimental glautooma. Very definite microscopic evidence

ADULI HUMAN I NIOMI IRIUM IN 11SSUE CUI TURE!

By HIRBERT I HAUT MD BALTIM RE MARKEN Frink Cy I Hep m 1 h J h 11 fk 11 1 4 L y

UI knowledge of the functions and interrelation of the female genital organs has been gained largely by chn ical observation and by the use of pathological and physiological methods of study cally all our ideas concerning the relation of the overy to the menstrual cycle have been gathered by u e of the older hi tological methods together with comingly logical deduction from animal experimentation. By these means a large number of generalizations have been made no able but we are still much in doubt a to the actual mech inisms by which the exclical change are produced such as ne see coing on in the endimetrium overs and other organs during the interment rual period

Our idea bearing upon the relation of the ovary to the change which occur in the endo metrium during the menstrual evels are founded pretty largely upon the vnchronou appearance of the craaman followed by the corpus luteum and a cemingly consi tent change in the endometrium together with observations of what occurs in the absence of ovarian change alb ence of ovaries or sun pres ion of their activity. Accurate information concerning the details of the c changes has been withheld principally for the reason that thu far no method has sufficed for the close inspection of the various trisues concerned during the change and no method has allowed the isolation of the many complicat ing factor of importance. Reilizing the and casting about for a new meth xl of approach thought important to determine whether or not the tissue culture technique with its opportunities for observation and control could be applied to the problem

Thus for the method of tissue culture has been confined time tentrely to the study of embryonic tissues becau e the e are far more easily and satisfactorily grown. Adult tissues of any origin are more difficult of continuous cultivation than are those from young or embryonic organisms for the reason apparently that embryonic cells po sees greater.

ability to cause synthesis of protoplasm from the various types of media that have thus far been developed. But despite this fact it was hoped that if a method could be devied whereby adult human endometrial and our rian cells could be cultured the facilities would be at hand which would overcome to a certain extent the difficulties that have hindered the accumulation of more detailed and specific information in this field. It would be valuable because the tissues could be watched continuously from hour to hour through all their changes and each experiment could be adequately controlled. It would also provide the possibility of varying the forces at work or of altering them completely

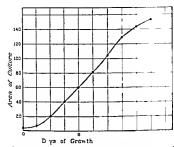
Such a technique has been devised and human endometrium has been grown success fully after many fruitle—attempts for as long a class in the Its principal features are alcinteral with or are modifications of the technique which has been developed by Carrel (2 3)

TECHNIOLE

The endometral tissues were secured from the uterine cavity of uters freshly received from the operating room. While still warm and sterile the uterus was opened and a small portion of endometrium was removed and placed in warm sterile Ringer's solution. At the same time blocks were also cut from the endometrium for micro copical preparations. The e-sections gave information concerning the stage of the menstrual cycle and the presence or absence of infection.

The sterile endometrium was carefully washed in several changes of Ringer's olution to free it of all po sible traces of blood. This step is quite important as was found by experience for traces of blood serum are very inhibitory to the growth of adult cell. This such as cut into very small fragment. The ewere transplanted into a medium composed of two parts one part was solid and formed from a fibrinogen suspension and

Raber hard lath gif ly lated d Aply



Fi I The composite growth curse of a ultustroma cell of human endometrium. The interpretation of 2 days in which little growth occu. The rate growth is approximately one half that of mbryon in blasts in the same media.

dilute embryonic extract containing a trace of sodium linoleate to prevent digestion of the clot the other part was fluid and was com posed of tyrode solution The fibringen sus pension was introduced first being diluted with an equal volume of tyrode solution so that the whole volume was I cubic centimeter T) rode solution o 5 cubic centimeter con taining a trace of sodium linoleate and ob cubic centimeter of dilute embryonic extract were then added. The fragments of endo metrum were then carefully placed in the medium equidistant from one another before coagulation took place The medium was then allowed to solidify and 1 cubic centimeter of tyrode solution was added Before the im plantation of the tissue was done the medium was carefully tested to determine the hydro gen ion concentration and the necessary modification made The hydrogen ion con centration was maintained at approximately 7 2 The fluid medium was changed every day and replaced by fresh tyrode solution use of fibringen suspension as the source of the clot was adopted when it was found that the small traces of serum remaining in the clots formed from plasma was inhibitory even after repeated washings

The rate of growth of the cultures was measured each 48 hours They were placed in a projectoscope which cast a shadow of



Fig The edge of a culture of endom trial stroma c II The culture 1 14 d y old This culture was gro n in a medium in hich corpus lut um extract vas ub 11 tuted for embryonic ti sue extract

known magnification the shadow was out lined its area measured by means of a plani meter and the area computed and charted. The areas were plotted from day to day so that a growth curve for the various cultures was kept. In this way it was possible to ascer aim with a good deal of accuracy the average rate of growth of the endometrial cells in the media used. This was found to be about half as fast as that of embryonic cells in the same media.

DESCRIPTION OF THE ENDOMETRIAL CULTURES

During the first 2 days following transplan tation the explant increased only slightly in size. The following 2 days there was an increased rate of growth roughly twice that of the preceding period. Subsequently the rate of growth remained about the same there being an almost uniform increase in size. Accidents such as infection or liquefaction of the dot of course stopped growth or slowed it and such cultures were discarded. Figure 1 is a composite chart of 15 cultures and demon strates graphically the rate of growth of the tissue.

At various stages cultures were fixed stuned and mounted for microscopic study. It was found that the growth occurred almost wholly from the stromal or connective tissue portions of the explant. The epithelial cells



Is 3 \under le fimit in the mit de Thent I to Islifmi The fift it to shift in his

apparently had such a long latent period that they were markenner by the troops and line type true for energia tissue cells on the periphery of the culture and by circlully ectioning a culture of a botton only the peripheral cell we were able to obtain pure string of terms and largure is a culture from from neb an explaint. By ure 3 is a high power photomic particle obtained in a similar manner from a culture in which the stroms will can find in the high cell of the culture of epithelial cell obtained the stroms will can find in which the epithelium survived and grew lumin ruth.

I NIT RIMENT

Being possible de de a pure culture si tromacell which was growin it a known ente of growth in a media of known composition saserum free fibrin dot embroonic extract and tyrode solution at seemed de arable to deter mine a possible what effect follreular thind and an extract of corpus luteum cells would have on such a culture if used to replace the embraonic extract

Follicular fluid was obtained from unrup tured grantan follicles. These were found in freshly removed human ovaries from the operating room

In a imilar minner corpora lutea were obtuined and an extract of the cells made in a manner exactly similar to that used for the preparation of the embryo extract. That is the corpora lutea were carefully dissected out of the ovary cut into small fragments and washed in numerous changes of sterile

I inject's solution. The fragments were placed in a sterile Latapic apparatus crushed mived with in equil volume of I inject solution and frozen and thiwed twice to rupture the cell. As fur in equal volume of Rin ersolution was added the mixture placed in entiring tube. Centrifugalized for 10 min utes and the supernitant fluid decanted. This contituted the corpus luteum extract used in the experiments.

An experiment consisted of three groups of 15 cultures each. All three groups had similar media with the exception that A had embry ome tissue juice. B hid follicular fluid replacing, the embryone tissue juice and C had the corpus luteiim extract replacing the embryone extract. All in imiliar volume.

The culture in B group survived 6 or 8 days with high cell migration but no real growth. I specified experiments with greater volumes of the following fluid 1 are the amore result.

The result was quite different in group C in which the corous luteum extrict was used in place of the embryonic extract. Here there wa a mo t luxuriant and rapid growth of the cell equaling and in ome instances exceeding the rate of growth in the culture containing the embryome extract Control consistin of culture in which ovarian stroma cell extract na u ed were not made. The was not con sidered necessary in the light of Drews work () in which he found that adult cell did not grow in the ab ence of embryonic extract o in the ab ence of autolytic products which he thought were formed in the explant it elf after several days of incubation. Obviously these experiments should be repeated with the ovarian stroma cells as controls to eliminate a pos ible source of mi conception

I tigure 5 gives in the form of a graph the relative rate of growth in the three types of cultures. It will be seen at once that in this series of experiments 15 cultures to the group 45 to the experiment in the corpus luteum extract is made there are substances analogous to those contuined in embryonic extract. That is there are substances present which enable the cells to metabolize some portion of the culture media into protoplasm and to reproduce themselves. That there are not the autolytic substances described by Drea

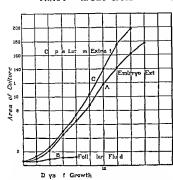


Fig. 5. A graph representing the composite growth curves of 3 series of cultures. Lach series const. t. d. of. 15 cultures. They were similar except that 1 contained embryonic tissue extract. B contained folloular fluid. C. on tained corpus luteum extract.

seems certain as the extract was used fresh and was kept in an ice box. On the other hand it seems to be a much more stable substance than that contained in embryonic extract as temperatures up to 6, degrees C for 15 minutes did not affect its potency to any appreciable extent.

DISCUSSION

The question at once arises as to the nature of the substances present in the corpus luteum extract is it similar to that contained in embryonic extract and is it the same substance which causes the cyclical changes in endometrium in the woman? The latter can not be answered at present. The former probably can be settled by further study.

Carrel and Baker (r) in a very brilliant series of experiments have demonstrated that fibroblasts in pure culture obtain the nitrogen from which they build protoplasm from proteoses and other primary derivatives of proteins. By splitting the protein molecule to various degrees they have obtained substances proteoses which are assimilated by the cells and metabolized to form protoplasm. They were able to produce this substance from a variety of sources. They replaced the



Lig 4. An 18 day culture of stroma cells grown with corpus luteum extract. The dark group of cells (right) repres ats the ori inal explaint. There is a liquefaction of the clot hence the irregular outlines of the culture.

embryonic extract by solutions of proteoses in their tissue cultures and secured cellular response in the form of growth activity very closely paralleling that of their embryonic extract controls

In view of their work which was published after this study was well advanced it is ob viously necessary to repeat the corpus luteum extract experiments with extracts which have had careful nitrogen determinations to dis cover the degree to which the protein mole cules in them may have been split before any definite conclusions can be drawn from this work The work is presented at this time as a demonstration that the method is practical for the object in view and that in the near future physiological problems may be attacked by this method of study with the possibility that valuable information may be gleaned by its use. It is also a demonstration of the practicability of the use of adult tissues in this connection

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CHONDRODY SPI ASIA

By MARIER CIPALIAND AD ART ACRE

I interest in chondrody splays was amost the exact counterpart of acase by Cole (8) in 1926 which was almost the exact counterpart of acase we have had under ob ervation at the New York Orthopythe Dispensiry

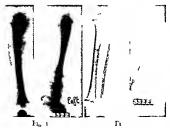
The condition is generally considered to have been first described by Ollier (10) in 1800 as irregular growths of cartilage localized near the epiphy es of the long bone, of one side of the body with resulting skeletal deformity These cartila mous masses adjacent to the epiphysis undergo delayed as attention which behavior differentiates them from multiple chondromata which never o sify. Office considered the condition to be quite distinct from achondroplasia with its more complete arre t of development but in his opinion it is not unlike rachiti which re ults in overgrowth of cartilage at the eniphyse with sub equent ossification. He noted le ions in the phalange of the fingers with re-ulting soft con istency allowing the philany to be pierced readily Chondrody splasia tends to heal pontaneously by replacement of cartilige with bone

The disea e de cribed by Ollier was made the subject of a the is by his pupil Molin (18) in 1000 who described 3 cases 2 of Ollier's and 1 of Nove Jos erand and Destot s stated that the identity of dyschondroplasta and osteogenic exostosis needed further study The salient features of the type of dyschon droplasia which he described may be stated as follows It is an osseous distrophy iffection the long bones of the extremities and the meta carpophalangeal skeleton with partial arrest of development and curvature of the long bones resulting The diagnosis can be made by roentgenography Its etiology is unknown and there are no microscopic or macroscopic observation on the disease Molin's observations regarding the confusion existing between

chondrodysplasm or dyschondroplasm and multiple cartilaginous exostosis were timely and as a matter of fact the confusion of terms and conditions still persists

I brenfried (10) reported 600 case of hered itary deforming cartilaginous tumors under the title of Hereditary Deformin Chondro dysplasia \mong this large group le 5 than 1 per cent showed marked asymmetry A h hurst (1) under the same title reported in cases that he had observed Amon others reporting cases of heredityry deforming car tilaginous tumors are Percy (21) Rentreu White (3) Campbell (6) Ord (20) and Les in (16) The latter recently recorded 6 ca es and used the name sugge ted to keth and used by him diaphysical acla is Keith (14) con iders Olher's type of chondrody plasta only an extreme example of diaphy eal acla is His ummary is as follow The diea known to clinician as multiple exosto i 1 a detinite disorder of growth and should be named diaphy seal aclasis to indicate the na ture of the growth di turbance. It is con genital in point of origin and affects only those parts of the skeleton which are developed from both cartilage and membrane. It is related to achondroplasia and there is rea on for su pecting that it may be due to a di turbance in the function of the gland of internal secre tion the thy rold gland being the one which t most hkely to be at fault. The study of the disorder helps us to analyze the normal ma chinery of bone growth While these mul tiple cartilaginous tumor may have some thing in common with Olher's disease the clinical picture of the latter makes the few recorded cases fall into a discrete and definite httle group from the clinical standpoint

Coon (a) added a typical case in a child with the right upper and lower extremite: 1 volved showing lessons in the metatarsal and metacarpal of both sides of the body. He noted by roentgenogram of the long bones The moley half of the day of the state of the showing lessons.



First 2 and 3 Roenigenogram Jul, 10 o The long bones of the left leg are short. The distal nuch of the libbus senlarged and in this area there is debrem volume structure apparently cartilaginous for the most pit. The bone is of coarse structure and appear in irregular trand and masses extending from the bony shaft into the cartilaginous portion. The os ification is best de eloped point or lot the central aux of the mass and is ab enial in periphery except for a flaring of the cortex of the h ft at the provinal end of the mass.

There is no evidence of active destruction or effu on o militation. The epiphy is so and slightly and irregularly ossified. Similar changes are present at all the metaphy e of the long bones of the left leg except the pro insal end of the fibulia in the left side of the pel is and in som of the fibulia in the left side of the pel is and in som of the left metatrasis. The phalanges are not hown. Whr the epiphyseal line is visible it appears of normal with and the epiphyses are much less affected than the me

taphyses

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Bentzon (2) in 1924 while reporting 1 case of Ollier's disease could find in the literature only 12 other similar cases His views which are of interest may be summarized disease represents the typical reaction of the bones against certain disorders in the inner vation of their blood vessels. It is often con fined to one half the body Masses of hyaline cartilage are found to follow paths similar to those of the arteries of the bones The patho logical processes in the bone tissue may be assumed to be related to the formation of callus in a fracture where the blood vessels have been interrupted He disagrees with Ollier and Wittek (24) who described the dis



ease as a disturbance of epiphyseal growth He regards this as a secondary phenomenon Theprimary focus is he believes in the diaphyses which are nourished by a single large nutrient artery. From an experimental stand point working with rabbits he was able by interrupting the sympathetic nerves in some instances to produce structural changes in bone similar to those seen in Ollier's disease. Bentzon's theories of the etiology of Ollier's disease supported by his studies form a valuable contribution.

Voorhoeve () presented cases of a brother and sister whose roentgenograms showed longitudinal striation of the metaphyses of the long bones and pelvis. These manifestations he considered allied to chondrody splasiabut the symmetrical distribution places it out side the category of Olher's disease. A valuable list of references is found in his presentation.

Jansen (11) reported a case of unilat eral chondromatosis which he properly calls

CHONDRODY SPI ASIA

By MATHEL CITALIAND ALD AND ARE Forth (I I h N w) k Or hop I I pe y dlip i

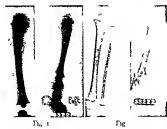
Interest in chondrodysphasia was aroused by the presentation of a case by Cole (8) in 19 6 which was almost the exact counterpart of a case we have had under observation at the New York

Orthopadic Di pen ary The condition is generally considered to have been first described by Office (101 in 1800 as irregular growths of cartilage localized near the epiphyses of the long bones of one side of the body with resulting skelet il deformity These cartilaginous masse adjacent to the epiphyses undergo delayed as incation which behavior differentiate them from multiple chondromata which never ossify Office con sidered the condition to be quite distinct from achondroplasia with its more complete arre t of development but in his opinion it is not unlike rachitis which re ults in overgrowth of cartilage at the epiply scs with subsequent ossification. He noted lesions in the phalanges of the imgers with re ulting oft con istency allowing the phalany to be pierced readily Chondrody splasia tends to heal spontaneously by replacement of cartilage with bone

The disease described by Ollier was made the subject of a thesis by his pupil Molin (18) in 1900 who described 3 cases 2 of Ollier's and t of Nove Jos erand and De tots stated that the identity of dyschondroplasia and osteogenic evostosis needed further study The salient features of the type of dyschon droplasia which he described may be stated as follows. It is an osseous dystrophy affecting the long bones of the extremities and the meta carpophalangeal skeleton with partial arrest of development and curvature of the long bones resulting The diagnosis can be made by roentgenography Its etiology is unknown and there are no microscopic or macroscopic observations on the disease Mohn's observa tions regarding the confusion existing between chondrody splasm or dyschondroplasm and multiple cartilaginous exostosis were timely and as a matter of fact the confusion of terms and conditions still persists

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Coon (9) added a typical case in a child with the right upper and lower extremities in volved showing lesions in the metatarsal and metacarpals of both side of the body. He noted by reentgenogram of the long bones The m lgr(1) tds dd dm f sp



Figs r 2 and 3 Roentgenograms July 1920 The long bones of the left leg are short. The di tal inch of the tibia is enlarged and in this area there is a deficiency of bone structure apparently cartilaginous for the most part. The bone is of coarse structure and appears in irregular strands and masses e tending from the bony shaft into the carti laginous portion The ossification is best developed poste rior to the central axis of the mass and is absent at the periphery except for a flaring of the cortex of the shaft at the pro imal end of the mass

There is no e idence of active destruction or effusion or infiltration The epiphysis is only slightly and irregularly ossified Similar changes are present at all the metaphyses of the long bones of the left leg except the proximal end of the fibula in the left side of the pelvis and in some of the left metatarsals. The phalanges are not shown. Whe the epiphyseal line is visible it appears of no mal with and the epiphyses are much less affected than the me taphyses

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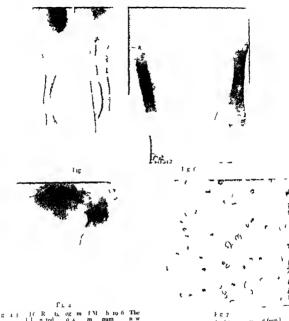


Fig 3

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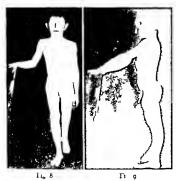
Olliers di case The pathological study of ex ci ed tissue showed cartilage cells of the my comatous type

Cole has written very conce ely on this disease giving summarized case reports on five patients besides his own a clear cut case of chondrodysplasia. He concludes as follows

I Olher's di case is a term which eems fixed in the literature but which should be used only to designate those cases of earlingmous dystrophy with or without cart leginous tumor formation which show an asymmetrical involvement of the body as the outstanding clinical feature.

ft b

2 Chondrody splasta is a condition which is usually asymmetrical but as several symmetrical cases are on record the term must



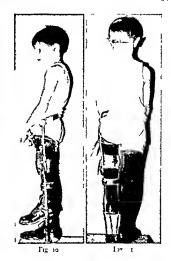
Figs 8 9 10 and 11 Photographs taken of the patient in 1927 at age of 9 year

therefore be broader in its application than Ollier's disease

The gradation of reported cases between those of frank multiple cartilaginous evostosis on the one hand and the so called chondro dysplasia with no change in anything except the internal architecture of the bones on the other is so varied and irregular that a definite classification of cartilaginous dystrophies is still impossible. The possibility that the widely different findings in some of these cases are only manifestations of different stages of the same condition must not be overlooked.

The cases of cartilaginous dystrophy which may be classified as Ollier's disease have been reported as follows

Olher
Nové Jos ran l'and Destot
(These 3 craces w re made the ubje t of
Volin's thesis)
Wittek
Burchard
Locon
Sven Johans on
Chris Johanne son
Bojssen
Hentzon
Jansen
Col
Le e r ported here



In 1924 Bentzon reported that he had found 12 case in the hierature besides his own but there is probably a mistake in the first 3 cases Bentzon ascribed 3 cases to Ollier and Mohn and 1 to Nov Josserand and Destot but Mohn s thesis was built up on a pre entation of 3 cases 2 of which were Ollier s and 1 that of Nove Josserand and Destot

A search of the literature since 19 4 has shown only 3 additional cases. In 1925 Canelli (7) reported a case of cartilaginous dystrophy in an infant which lived but 2½ months with lesions involving the metaphyses of both humeri and of both femora the coxal bones and sacrum. The roentgenograms of this infant showed irregular deposits of calcum in the areas mentioned a picture quite similar to that shown in Fig. 4 taken when our patient was 8 years old. This case is in teresting as a picture of marked symmetrical skeletal deformity due to irregular growth of cartilage in the metaphyses of the long bones.

it t n



Fg 3 4 16 Pts og m tal 1 Otb 927 1 det t th 1 od 1 I uh tidit t lo t t pp a g m the cts o a 1 th 1 m g m h I m h p m ded t h 1 g f both had df t dth 1 ft m t 1 1 f bul 1

as clo ely allied to Ollier's disease In 1926 Mauclaire (17) reported a c i e which he culbe Ollier's disease but which obvioush falls out side this group as commonly accepted It is not asymmetrical and the roentgeno, rum do not show typical lessions

The history of our case follows

H em n d a av f om the d pe sary for 3
y as du g hi ht meh see natimter l of
6 month by th vi ting nur Hs 1 tree ng
h tory thout nite et a ide from the fact that
hre wa a gradually r a mig d party m length
betw n the ght a d left l gs. He was fore d to



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r turn to the disjen ars whinh could n longer

In Jun 19 4 at the age of 6 years the liftly is tmost 6 inches short rithin the right short englishing distributed equilible ten things and lib. In this sharp literal bowing of bit hims and fibulath a tension lightness and cortext and a ten in to orretth diffinition liftless a ungrestel to did not lightness at lab but unfortunately did carl diffirm propries at lab but some none os fill and rightly lightness alcareous nodule in the artilignous arise of this is some none of the s

July 21 10 4 The pat nt ent red the bo pital

NE 1-UREVENTS OF LOWER EXTREMITIES

Lfllg Therest mol rate ant rolat rails agod
the upper their of femur which is co detably on
lare, de Function at hip in no mal knoesho snot
mal muscle balanc. Therest mark diposterolatera
box ngo of the little that of the that Both
t mt fitheitha e enlagd and the is
d g es flate alt.

The foot is rotated laft all 90 digrees. The Wassermani reaction is a





1 1

doubtful positive and tests made on both parents were negative but the patient was given four in jections of neosali arsan on the remote chance that anti-lieft treatment might help. Following these treatments an uneventful year intervened. No instory of any similar trouble could be chetted in any near or remote member of the patient's family

June 1925 The patient again entered the hos putal ward. The left log was noted as being 6 inches short. Although there is some discrepancy between the measurements of 1924 and those of 1935 which might be due to the range of error of different examiners the dispants between the right and left leg remains the same.

MEASUREMENTS

Entire len th ante ior superio	I Lit	I b	l h	
iliac spine to m dial malleolus	14	0/	6	
Tba	7 7	10	3 2	
Circumfe ence of th gh Circumf rence of calf	3/	8	1	

An osteotom of the tibia was done to correct the deformity. The bone was divided at a point below the center where it was found to be quite brittle the patient when the correction of deformity. The patient wore a plaster of Pains circular splint for two months and then bore weight with his extension brace.

For the next 18 months the patient returned to the di pensary at intervals of every 3 weeks. The condition remained unchanged Another roent genogram was taken in March 1926 (See Figs 4 5 and 6)

January 1927 age 9 years the patient entered the hospital for an exploratory incision for the pur pose of microscopic examination of the tissue The Wassermann was negative the Mantoux negative The blood count showed red blood cells 4,750 ooo white blood cells 14,800 hæmoglobin 75 per cent polymorphonuclears 75 per cent small lympho cytes 20 per cent larg lymphocytes 3 per cent transitionals 2 per cent Urinalysis was negative

At operation the periosteum was divided and the tibia was expo ed at the lower metaphysis. It had a soft melon rind consistency and several pieces were removed for study.

Pathological report Gross examination The tis sue consists of six small fragments of translucent blush white homogeneous tissue resembling cartilage Microscopic examination Sections of cartilage show extensive cystic degeneration small and large cysts being present There are also several rather large roughly circular spaces in the cartilage containing strands of delicate connective tissue

Diagnosis Cystic degeneration of cartilage (see Fig. 7)

There is nothing of moment to report until his most recent examination in September 19.7 See Figs 8.9 to and II Examination shows that all motion in the left leg are free and normal General condition is excellent

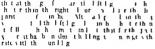
MEASUREMENTS SEPTEMBER 19 7

Anterior upe o il ac sp n to ole A terior superior il ac sp ne to	19	5/	6/
medial malleolu	16 /	23/	7
F mur	9/	3/	4

Total height 46/ inches

Roentgenograms were again taken at this time which how progre sive change in the lesion (see Figs 12 13 14 15 and 16) It is interesting to note





SUMMALS

This cae i unque tionably a choudro dy plana of the type called Other the ease It is in asymmetrical cartilaginou dy trophy with re-ulting skeletal deformity confined to the left lea It is undergoing delayed os itea tion and healing pontaneously which is the u unl cour e of event according to Office The affected long bones are growing Atter having faller behind 61 inche in length during his tirst 6 year for the pa t 3 year they have almo t kept pace with tho c of the sound leg. The disc ise is extremely distibling because of the unilateral retardation of bone growth. Whether this a an unusual manufe tation of the condition known as bereditary deforming chondrodysplasm or multiple car tilingmous tumors as Keith believe or is a di tinct entity as Ollier and others have be lreved has not been proved. Other's state ment that the e critilizinous masses undergo delayed assification and tend to heal sponta neously while the multiple chondromata never ossify seems to indicate a fundamental



Γg ø

difference. The hi tory of this patient seems to land weight to Ollier conclusion. On the other hand a study of the case reported by Cancilly make one wonder whether the a ym metric feature of this mall group of cases mucht not be a concidence. While the e 15 patient may not repre ent an e ential differ ence in mathology from that displayed by a much larger class of cartala, mous distrophies the clinical picture of each case is o ven similar to the others that they cem to fall into a very ele ir cut group Bentzon's theory that this condition represent a disorder in the innervation of the blood ve als of the lon bones and that the proce is a circulatory disturbance is interesting

The condition is rare and this ca e1 added to the erie with the hope that the obervation of such a patient over a period of 7 years may be of some value. It is to be hoped that he may be studied until he reache maturity.

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MULTIPLE POLYPOSIS OF THE COLON!

BY H AROLD E HULLSIFK MD FACS ST PAUL MINNESOTA

1 tru t S g ty M d 18 hool U v f M cw t

HE term polyposis of the colon has been interpreted by different writers at van ous time to mean a ingle polyp scat tered polypi or an actual polyposis in which we find the entire large bowel including the rectum the seat of thousands of se ile ideno matou tumor The finding of a single polyp is certainly not a rare occurrence neither are multiple or scattere I sin be polyps in the lame banel uncommon Areas of polypo is which are the re-ult of ulcers tricture carcinoma or other much membrane irritation are fre quently encountered but we still have remain ing that type of polyposis which occurs most often in young popple and in which the normal muco 11 entirely replaced by countle tumor of approximately the 1mc size 1 his latter form has been very correctly named by Frdmann and Marns, adole cent concental di seminated polynosi in contradistinction to all other form

Lockhart Mummer; cli thes the adenoma ta occurring in the bowel a follows (1) true multiple adanomat; () polyps a ocited with hyperplastic tuberculo is (3) multiple polyps associated with old stricture of the colon (4) polypoid condition re ulting from ulcerative colitis. An in pection of the egroups show that they fall very nicely into Erdmann classification the first being the adolescent type found in the voith with the concentral predisposition the three remaining groups the result of one kind or another of irritation or training to training the may say

The classification of I'rdmann and Morns made on a chuicil bi is compines two forms (r) adult accounted type and () adolescent congenital disseminated type. They place in the fir tgroup the single poly. In view of the fact that single poly passes sometime found in very young children it might be suggested that the terms adult and adolescent be omit ted, they being called simply congenital and acquired. I urther the term adolescent might be confusing in that while the condition in the second group is undoubtedly the result of a

hereditary predisposition at the same time it occasionally does not manifest itself until after adole cence

The congenital form usually becomes evident in childhood or youth rarely has a discoverable as ociated and etiological lesion 1 often shown in other members of the family and has a high mallymanes incidence

HISTOPICAL.

Menzel in 17 1 reported a case of what ha all the carmarks of the congenital type in a boy of 15 years In 183 Wa ner and in 1839 I okitansky reported cases of multiple poly posis the type of which is uncertain Leberts case reported in 1961 a female a ed 32 year the first description of the polypi them The cale reported by Lu chka in the ame year was in a woman a ed so years In this case the muco a of the entire colon and rectum had been replaced by polyps Woodnard s cr e a nomin aged 14 year the entire colon including the rectum showed polyps Virchow at this time reviewed a cale of he and of Lebert and of Luschka under the term colitis polyposis cystica \ \ on Port col lected 14 ca is which were added in a tabu lated list to 35 more collected from the liter ature hy Doering in 190, In this ene are given two personal cases of Doering's Soper Struther in in 1016 added 8 more cases 19 o reviewed 9 ca e of multiple polypo 1 of the intestinal tract and in 10 4 20 ca e of multiple polyposis of the gastro inte tinal tract In this series a number contained polyp in the small bowel and stomach These pos sibly do not belong in a series of cases of pol po is of the colon but have been included Likewise a number of cases in the same senes have been excluded becau e of insufficient data to make at permissible to list them a true ca es of multiple adenomata

A review has been made of the above men toned or es and others which includin the writers total 1 7 Tollowing the scheme et by Doering the 17 collected on es have been

dassified under the headings of age existe duration of symptoms malignancy hereditary tendency treatment and results and in at tempt has been made to draw some conclusions from the information collected. Since all cases listed as multiple polyposis of the coloniare included it is probable that a number at least do not belong to the congenital type although a number which were given in which cent detail to mark them as obviously belong ing to the acquired type were excluded.

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Quenu and Landell report that over 30 per cent occur between the ages of 15 and 35 vears. Cripps saw three eases in the same family one aged 20 another 17 and the third 16 years of age. Erdmann had two mile patients 14 and 16 years of age and one female aged years. The writer sense was that of 2 male aged 32 whose brother succumbed to 2 multiple polyposts (proved at autopsy) at 34 and the 17ther at 44 after having been ill with bowel trouble for years. Of the 17 cases the ages are given in 93. The average age is 30 9 years divided as follows.

Under to years	5
to to 20 years	23
o to 30 years	τ
30 to 40 years	23
40 to 5 years	ī
5 to 60 years	4
60 to o vea	
70 to 80 years	

The youngest patient was 5 years the oldest 74. The number of patients between 15 and 35 years for which period Quana and Landell quote as 50 per cent was δ_3 or δ_5 δ per cent in this series. This is especially ignificant when one considers the following paragraph

DURATION OF SYMPTOMS

The duration of the symptoms was noted in 60 of the 1-7 cases as follows

CP	
5	8 3
g	15
9	1 2
8	13 3
4	6 1
?	11 8
6	10 1
	118
3	8 3
	5

Of the 60 cases in which we know the duration of symptoms 31 or approximately one hall have probably had symptoms to years the average age of 30 9 years would have been reduced materially if these patients had been discovered and their condition had been dry most of earlier.

SEX

It has been generally supposed that male are more frequently affected. However, a thus series there was only a slight difference of 98 in which the sex was given 5° 53 pc cent, were males and 46° 47 per cent, were lemiles.

SITE

I he area involved was given in 106 cases a follows

	c	P
Rectum an I colon	44	41
Rectum alone	26	4
Colon	2	20
Large and small bo vel	II	10
Large small bowel and stomach	ī	۰
Rectosigmoid junction	r	٥
Creum and colon	1	۰
Totat	106	

MALIGNANCY

In many of the cases the question of malignant change has not been settled in fact verified it could not from the nature of the case be accurately determined. However, in 4 cases or 34 oper cent of the total carcinoma tous change was either present at the time the diagnosis was made or occurred later. This 1 is decrease of 8.4 per cent from Doering and Soper's senes in which the malignancy was 4, per cent.

When we consider that 42 of the 17 case were known to have malignant disease and that 31 more in whom the question of malignance remained in doubt died rather early o cachevar invinction or bleeding it is only fail to suppose that the malignancy index in the senes is actually higher than the figures represent. Mummery states that almost all recorded cases of multiple polypi of the color eventually become malignant and this was the factor to be reckoned with in treating these cases.

MULTIPLE POLYPOSIS OF THE COLON'

BY H WOLD I HUIISIFK M D F 1 CS Sr PAUL MINNESOTA

S g y Med 15 hool U y f W esat

THE term polypo is of the colon has been interpreted by different writers at van ous times to mean a mole polyp cat tered pelypr or an actual polyposi in which we find the entire large bowel including the re turn the sent of thou and of e ale adeno matou tumer. The finding of a single polyp a certainly not a rare neutrence neither are multiple or cattered in the pelvo in the ame bowel uncommon Area of pelypoa which are the realt of alcer tricture Circinoma or ther much membrane irritation are fre quently encountered but we till have remain ing that type (1 polyper) who hoccur mo t often in your pen le in I in which the normal much at entirely replaced by countle tumors of approximately the time size latter form has been very correctly named by I rdmann an l Morri a lole cent congenital di seminated polyparan in controli tinction to all other form

Lockhart Munmers cla the the adenomata occurrin in the bowel 1 follows (1) true multiple al n mati (1) polyp a occited with hyperply the tuberculo 1 (3) multiple polyp 1 exacted with feld structure of the colon (4) polypoid condition resulting from ulcerative colite. An in pection of theory from how that the full very much middle adolescent type found in the youth with the concential predisposition the three remuning groups the result of one kind or another of intribution or training to the mucosa.

The clus iteation of Ledmann and Morris made on a clinical basis compines two forms (i) adult acquired type and () adolescent congenital disseminated type. They place in the first group the single poly. In view of the fact that single poly passes sometime found in very young children it might be suggested that the terms adult and adolescent be omitted they being called simply congenital and acquired. Further the term adolescent might be confusing, in that while the condition in the second group is undoubtedly, the result of a

hereditary predisposition at the same time it occasionally does not manifest itself until after adole cence

The congenital form usually becomes endent in childhood or youth rarely has a discoverable as ociated and etiological lessos often shown in other members of the family and has a high malignancy incidence

HISTORICAL

Menzel in I, I reported a case of what has all the carmarks of the concental type in a boy of 15 years In 183 Warner and in 1830 l okitan ky reported ca es of multiple poly no is the type of which is uncertain Leberts ca e reported in 1861, a female a ed 32 year is the first de cription of the polypi them selves The case reported by Luschka in the ame year wa in a woman aged so years la the ca e the muco a of the entire colon and rectum had been replaced by polyps In Woodward s case a woman a ed 44 year the entire colon including the rectum showed polyps Virchow at this time reviewed a cae of he and of Lebert and of I uschka under the term colitis polyposis evetica Von Fortcol lected 14 case which were added in a tabu lated list to 35 more collected from the liter ature by Doenne in 1907. In this ene are given two per onal cases of Doering s Soper in 1916 added 5 more cases Struther in 19 o reviewed 39 cases of multiple polypo 1 of the intestinal trut and in 19 4 oca es of multiple polypo is of the gastro inte ti al tract In this series a number contained polyps in the small bowel and stomach. These posibly do not belong in a serie of cale of pol posts of the colon but have been included Likewise a number of case in the same ene have been excluded because of insufficient data to make it permissible to list them as true cases of multiple adenomata

A review has been made of the above mentioned cases and others which including the writers totals 1.7 Following the scheme et by Doern, the 127 collected case have been classified under the headings of the activation of symptoms mahignanch herediture tendency treatment and result and it tempt has been made to draw one and use sons from the information collected. Since all croses listed as multiple polypois of the colon are included at its probable that a number at least do not belong to the congenital type although a number which were given in unit cient detail to mark them as obviously belonging to the acquired type were evaluated.

101

Quant and Landell report that over 30 per cent occur between the ages of 13 and 3 veri. Cripps saw three cases in the same timbs one aged o another 17 and the third 10 ver of age. I rdmann had two male patients 14 and 16 years of age and one female aged 3 vers. The writer sease was that of a male aged whose brother succumbed to a multiple polyposis (proved at autops) at 34 and the father at 44 after having been ill with bowel trouble for years. Of the 17 cases the 1865 ire given in 94. The average age is 300 years divided as follows.

Under to years	
I to 20 years	2
2 to 30 years	
30 to 40 vear	2;
40 to 50 years	
50 to bo years	
to to o year	
o to 80 years	

The voungest patient was 3 years the oldest 74. The number of patients between 15 and 35. Sears for which period Quonu and Landell quote as 50 per cent was 63 or 65 6 per cent in this sense. This is a pecrally significant when one considers the following paragraph.

DUPATION OF SYMPTOMS

The duration of the symptoms was noted in 60 of the 127 cases as follows

8 3
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15 2
13 3
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8 3

Of the 60 cases in which we know the duration of symptoms 31 or approximately one half have probably had symptoms to years thus the average age of 30 9 years would have been reduced materially if these patients had been discovered and their condition had been diag possed earlier.

SF X

It has been generally supposed that males are more frequently affected. However in this series there was only a slight difference Oi 98 in which the sex was given 52, 53 per cent were males and 46 47 per cent were temales.

SITE

The are i involved was given in 106 cases as follows

	C es	_	ŧ
Kectum and colon	44	41	8
L ctum alone	26	24	7
Colon	22	20	ò
Lan and mall bow i	11	10	4
Large small bowel and stomach	1	٥	ġ
Recto igmoid junction	1	•	9
(recum and colon		0	ġ
Total	106		

MALIGN ANCY

In many of the cases the question of malignant change his not been settled in fact very often it could not from the nature of the case baccurately determined. However in 44 cases or 34 6 per cent of the total carcinomatous change was either present at the time the diagnosis was made or occurred later. This is a dicture of 84 per cent from Doering and Soper's series in which the mahgnancy was 45 per cent.

When we consider that 4 of the 127 cases were known to have malignant disease and that 31 more in whom the question of malignancy remained in doubt died rather early of cacheva maintion or bleeding it is only fair to suppose that the milignancy index in the series is actually higher than the figures represent. Mummery states that almost all recorded cases of multiple polypi of the colon eventually become malignant and this was the factor to be reckoned with in treating these cases.

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I VALUE TENDENCY

A feature of congenital polynosis which would undoubtedly be more evident if infor mation were available as the inherited predis position of members of a family to exhibit this discuse Mummery says It appears to be a hereditary condition as it can be traced through several generations and the curious thing is that in such families a large proportion of individuals die at a comparatively early age from cancer of the bowel Dukes hous charts of three familie. In the first family one daughter had multiple adenomata while her mother six uncles and aunts and her grand father died of cancer of the large bowel. In the second family two members are suffering from cancer of the rectum or multiple adenomata four runt and uncle are involved and both paternal grandparents. In the third family five members of the finity involving three generations on both sides, either have died of cancer of the colon or have multiple polyposis In the writer ase the patient his brother and father died of cancer supermoo ed as we know up the case of our of the two ons and probably in that of the fither on a multiple polyposis. In the ene of cases analyzed a definite hereditary tendency was noted in 12 cases or 11 1 per cent

MOLTALIN

In the entire series there were 61 known deaths 4, per cent

THE ATMENT

Fifty one cases 40 per cent are known to have been treated surgiculty. On the cases in which the treatment was either medical or not stated insufficient data were given to draw any conclusions as to methods. In the 51 cases operated upon there were 18 deaths 2 mortality of 33 1 per cent. In the remaining cases there were 44 deaths 2 mortality of 56 per cent.

TYPES OF OFFPATION

These are given more to show the number of procedures used than to make any deduction from the results. The type of operation per formed was given in 51 cases as indicated in the following table.

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In a consideration of the surgical procedure to be undertaken it immediately becomes evident that the type of operation depends on certain features in each individual case vizmiligation, extent of involvement condition of the patient and the technical ability and

surgical experience of the operator The usual extensive involvement in the con genital type of case renders a complete remov al of the entire polyp bearing area a more or less heroic task Trdmann says that the prob lem first is one of the determining of the ex tent of the proce s before operation. The car sometimes be done by palpation of the thick ened gut wall as was possible in Carroll's pa tient In our own case the entire bowel from Heoca cal valve to the anus was so markedly thickened and dought that a diagnosis of the extent was immediately possible when the abdomen was opened In such a case it would seem u eless to remove a part even thou h that part had already undergone make nant change and to allow to remain other hi his potentially malignant tissue or tissue which may already have become mali mant several separate and apparently primary can cerous areas have been found in the same ca e Lilienthal Soper and Erdmann have success fully done total colectomies with ileosi moid ostomics Coffes vas the first and I believe so far the only one to remove successfully the entire colon sigmoid rectum and anus with a permanent ileostomy in the treatment of this condition The author's patient was oper ated upon after Coffey s technique for colec tomy but died on the fourth day Less radical



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fig 4 Hgimg i t fmlgn tpolyp C t

If colon removed at or ration (Fig. 5) showed a solspo a which extend I from the r ctum up to the il ocacel junction At no point as any mucosa vi ibl but pl ced close t g ther on the inner surface er countless proj ctions. For the mo t part these vere small and triangular in shape with the base at tached to the all and the to exte d g into the lumen of th bo el They measured about 3 to 5 centimeters in length and vere covered by high col umnar epith hum luch was normal in appearance It sarrous p into throughout the colon were other larg [lyp u u lly attach d by a pediel long enough to allo th m to e tend v ll out beyo d the small rone Th se measur d 1 to 3 centimeters in diamet r and pre ente l irr gular surfaces Micro scopic sections sho ed them t be ide tical ith tho which h d b en r moved in o s and 19 6 The polyp of the colon ere of all sizes and shapes varying from t v triangular ones to large p duncu lated o es but none of th m showed a y sg sol

malignancy The autop : as performed O tober 4 There as an absence of the colon and the return remained a a necrotic stump co ere l by a fibrinou exudate Cross section sho ed th wall to be necrot c On the mucosal surface v as a raised ann lar ul erated area ith thick film overlanging necrotic edg 5 g vi th picture typical of a rial gnant proces but with no sugg tion of its having an e from a polyp Micro copic sect on (lig 6) sho ed it to cors tof larg mase of ep th lalc ll which ere atypical in app arane and which v r mak n a poor attempt at gland formation Th cp th 1 1g 1h bad infil ll an le t nd d back u d the trated th ent normal epithel um

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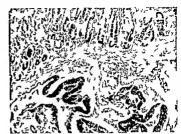


Fig. 5 Entire colon removed at operation. The smaller ma s in corn r 1 rectum removed at necropsy

but it was well circumscribed. No sign of inflamma tion was found except in the stump of the rectum and this was entirely localized. No anatomical reason for death was found

CONCLUSIONS

- There are two distinct types of polyposis acquired and congenital
- 2 Multiple polyposis is most common in childhood and youth the average age in this entire series being 30 9 years with over 65 per
- cent occurring before 45 3 The symptoms usually persist for a long time before medical attention is sought
- 4 Males and females are affected about equally
- 5 The probability of malignant change is high in this series 34 6 per cent
 - 6 There is a definite hereditary tendency 7 The mortality is high 47 per cent un
- der all forms of treatment 8 The treatment is not yet standardized



Fre 6 Section of rectum removed at necropsy showing irregular ma ses of atypical epithelium

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1 11) RT OF TWINTY INRIC CASE

B HATOLD I SIMON MD K at 1 171

THI retention of bloo I within the uterus 1 not uncommon but is not a common A as mucht be expected if one consider the numerou opportunitie in the werize fe mile for the occurrence of ob tru tion in the lower portion of the genital tract. Beade the congenital anomalic of the uterus and vacin a that are irequently obstructive in type many pathological conditions occur in the lifetime of a woman which may re ult in an acquired ob truction at some point within the lower portion of the genital tract u ually within the cervical canal The trauma of childbirth frequently repeated the various dica es that are likely to develop in the cervix as well as cert un urgical procedure are all capable of producing such obstruction and may result in the accumulation of blood or menstrual fluid within the uteru

The part or parts of the genital tract in which the accumulation occurs are determined by the site duration and extent of the obstruction and the rapidity with which the fluid accumulate If the obstruction is near the outlet of the vaging and a considerable portion of the vaginal cavity is patent above it the ready distensibility of this portion of the genital tract will accommodate a large quantity of fluid and lead to the formation of marked primary hamatocolpos before the uterus becomes involved (Fig. 12) When the pressure is increased sufficiently to di tend Abim th bm d bll the d Shlih U

the thicker and more muscular walls of the uteru ham (tometra results secondarily (Fi 1b) When however only a small portion of the taging remains patent above the obstruc tion the fluid is early forced into the uterus and hamatometra realts. If the value is completely obliterated or if the ob truction; in the cervical canal hematometra is primary and there is no ham itocolpos. In any case hamatosalping on one or both ides may be secondary to hematometra (Fig. 1c) and if the outlet of the fallopian tubes is patent and pressure is sufficient leakage may occur into

the peritoneal cavity to form hemoperitoneum In animals a collection of transulate or other sterile fluid may accumulate in the uterus as a result of congenital or acquired obstruction (14) but we have been unable to and a reported instance in which retention of blood has occurred According to Brumley obstruction to the outlet of the uteru max develop in animals as the realt of injuris arising during purturition from the pressure of inguinal hermin or followin hightion of the uterus which is sometime done to prevent conception In animal however with the possible exception of some of the hi her ages menstruation does not occur and the only way in which hamatometra coald develop even in the presence of obstruction would be as the result of bleeding from a retain dipla centa or from degenerating uterine neoplasm p 1 f 161km

y f M

Most of the reported cases of hematometrate of congenital origin. Among the earliest cases in this group is that of Chegoin in 18-9. The patient was a married woman aged 32 in whom hematometra had developed as the result of a congenitally imperforate uterus and absence of the cervix. In the same year Dance reported a case of hamatometra which had followed difficult and premature delivery. He stated that while it is not unusual for retention to result from congenital malformations he was unable to find another instance reported in which it had developed following labor. Both of these cases were successfully treated by puncture

Bernutz in 1848 reviewed from the literature a number of cases of hæmatometra and proposed a classification on an etiological basis into four groups (1) congenital () following labor (3) a reflex type comparable to existits with retention and (4) retention resulting from emotional states such as shock and anger He was the first to recognize that complete obstruction is not essential for the production

of humatometra

Dubruel's case reported in 1889 was of interest because homotometra developed after the menopause had been passed. The origin of the bleeding was not proved but fibromyoma was suspected.

A number of cases have been reported in the literature since 1900 and more attention has been given to the problems of treatment Horrocks in discussing treatment condemned the indiscriminate use of the puncture meth od which he believed to be applicable only in cases in which hematocolpos alone was

present
Qu nu and Le Sourd in 1906 reviewed
from the literature 8 cases of uterus didelphys
complicated by harmatometra. Six of these
had been treated by conservative operations
consisting either of drunage through the vagina usually combined with abdominal exploration or of hemity sterectomy. These
authors emphasized the importance of abdom
and exploration at the time of vaginal drain
age to guard agunst the danger of rupture of
adherent hematosalpina should the sudden
loss of fluid from the uterus cause it to con
tract rapidly, and extensively. They also

pointed out that in a uterus didelphys men struction may occur normally on one side coincident with the development of hemato metri on the opposite side. In one instance pregnance, had occurred in the unobstructed portion of such a uterus. While they were not able to find any record of pregnancy following conservative operation on uterus didelphys they believed it to be theoretically possible

In 1907 Sikora in discussing the treatment of hematometric called attention to the fact that the methods of treatment had varied from time to time but that there had been a progressive tendency toward the use of more radical surgical measures. He concluded that conservative measures should be employed whenever possible whether the uterus is single or double but that when the uterus is diseased it should be removed.

Andrews in 1911 reported two cases of hematometra complicated by hamoperito neum He had noted two similar cases in the hierature

Gellhorn in reporting an instance of ham atocolpos hematometra and hematosalpina secondary to gy natresia in a case in which the menopruse had long since been passed called attention to the small number of similar cases reported in the literature. He concluded that the most common cause of guntresia in the aged is a semile adhesive proce s secondary to sende vaginitis. As a re-ult of this proce s which is really a thinning of the squamous epithelium of the viging a raw surface is created the lumen of the vaging is narrowed as a result of changes in its elastic fibers, and when the walls approximate bands and con strictions develop. This type of obstruction he believed is most likely to occur at the juncture of the middle and upper third of the vaging because of the narrowing produced at that point by the levator ani muscles. The source of the bleeding in the e cases is usually from a tumor

Cases of various types and etiology have been reported by Gutierrez Eising I urslow Jone and others (r 7 rr 18 0 4 28)

CASES FROM THE MAYO CLINIC

Twenty three cases of hematometra all but one of which were verified at operation

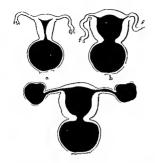
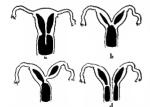


Fig. The first filf fml gilt twin transmitted fill gilt hand be a list that the fill the state of the fill the

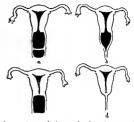
were ob erved at the Mayo Chuic from 191 to 19 6 inclusive. In 11 of the e the obstruction was concentral and in 1 at was required (Table 1 and II)

CONGENITAL TALL OF OBSTRUCTION

Ettology Embryologically according to Piersol the uteru develops from the muel



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in the second that seems that seems the second that seems that see

lerna duct which unite at about the eight wock of intra uterine life. If the the union of these ducts the intervening septum diappears and a ingle tube is formed the anlae of the uterus. I his end blindly and is joined to the urogenital sinu by a old chinder of cill. This lumenless segment of the fused muellerian ducts represents the anlae of the vigin. By the end of the fourth month of intra utenne life it too ha normally acquired a lumen and the anlage of the cervit has made its appearance at the uterox signal juncture.

The chief anomalous conditions of the uter is and vagina depend on defective or incomplete development or imperfect fu on of the two muelleran ducts. Are ted development of the lower part of the effect canals accounts for the ab ence of all or any part of the cervit or vagina or the persistence of a membrane obstructing their lumen at any point. Depending on the extent to which failure of fusion occurs all degree of deplication marresult. Duplication and obliteration of different portions of the gentral tract may cole utilize any occurs.

In order that ha matometra or hematocol
pos may develop as a re ult of con ental
anomalie two conditions mu t be fulfilled
the utcrus must be sufficiently well developed
to perform the function of menstruation and
the anomaly must include ome type of ob
struction which prevents the e cape of the e



Fig. 4. Case 7. Cro's section of uterus with hamatome tra from congenital atresia of the vagina and steno is of the external os

menstrual products Figures and 3 illustrate some of the more common anomalies or combinations of anomalies in which these conditions are fulfilled

The most common type of obstruction is an imperforate hymen or the persistence of a membrane across the vagina a short distance above the hymen (Fig a) Almost as often varying portions of the vagina may remun obliterated the atresia usually beginning at or just beyond the introitus and extending upward leaving only a shallow pit of a few centimeters to mark the site of the vagina externally (Figs b and od) If the entire vaging is absent the cervix may also be absent and the uterus attached in the pelvis by a fibrous cord Occasionally the vagina may develop normally while the cervix is absent or there is atresia of the cervical canal (Fig c) In a uterus didelphys or a uterus bicornis obstruction may be present on one or both sides in any position for which it has been described in the single uterus (Figs 3 1 b c and d)

In 11 of the 3 cases in this series the obstruction was of the congenital type and in 9 of these the anomaly depended on varying degrees of arre ted development of the vagina (Tables 1 A and 1 B). In one there



Fig 5 Case 8 Hymatometra and b lateral hæmato al pinx from congenital atresia of the vagina

was an imperforate hymen in two a dia phragm persisted across the vagina above the hymen and in 6 there were varying degrees of vaginal atresia (Figs 4 and 5) In two instances the anomalies were more complex (Table 1 C) The patient in Case 10 aged 17 years had menstruated regularly since the age of 13 but she had suffered severe attacks of lower abdominal pain especially marked on the right side and sometimes associated with the menstrual periods. Pain was becoming progressively more severe and recently had been associated with vomiting and hallucina tions There was incomplete uterus didelphys (Fig 6) in the left side of which was a normal outlet that had been responsible for the men strual flow. The outlet in the right side how ever was occluded and hematometra had developed

One case of true hermaphrodism Case II is included in the series I in this patient there was a uterus didelphys (Fig. 7) which communicated through the small vaging with the posterior male urethra at the verumontanum. The communication was so small however that it offered partial obstruction to the escape of menstrual fluid and caused a hæmatometra of bilateral hæmatosalping. The symptoms were typical of hæmatometra but be cause of the communication with the posterior urethra there was also periodic hamaturia associated with each attack of pain

Symptoms If there is congenital obstruction in the vagina uncomplicated by other

The we noted dealby Visso of

m t



anomalie the patient Live a hi tory of com plete absence of men trustion with the onset just prior to or at publity of monthly attacks of pain and cramp in the pelvis and lower part of the back. The pain at fir ta moder ately every but with ucceeding ittacks it becomes more severe and of longer duration The interval between the ittacks are thereby shortened uptil the pain 1 almo t continuous an I frequently almost unbegrable \ mse i and comiting and carving degrees of prostration are sometimes pre ent. Before puberty ouan title of mucou secretion may collect and distend the genital tract above such an obstruc tion thus producing mild symptoms but with the onset of puberty these secretions are rapidly augmented and replaced by the prod ucts of men truation and the symptoms soon become more severe

I he patient is often aware of a tender mas a men and the liver part of the abdo men and the liver positions is requently given of enlargement of this tumor coincident with the onset of each attack of print. The mass may decrease in ize somewhat after each individ uril attack but it doe not return to its previous dimension before the succeeding attack in tervien. In the pre ence of harmatocolpo, the pre-sure of this mass on the bladder may the rice to a moderate degree of frequency and burning on urination and occasionally to complete urinary retention (o. 21).

More complex anomalies may modify the symptoms according by When there i duply cation of the uterus with obstruction of the outlet of one side only menstruation occur regularly or the patient may become pre nant coincident with the development of hemato metra on the other side.

THE ACQUIRED THE OF OBSTRUCTION

The acquired type of ob truction s almost always in some portion of the cervi cil canal and is consequently not associated with hematocolno I he obstruction usually follow either evere lacerations from miscar ti Le or difficult labor or it is a direct re ult of a plastic operation on the cervix. Other occa iourd cholo-ierl a ents that have been re ported are the wearing of a stem pe san over a long period of time (16) the application of radium to the cervix (1,) fibromyomata ob tructing the lumen of the cervical canal (7) and adhe ions between the cervix and the nall of the vaning Only rurely has cautenzation alone of the cervit re ulted in ob truction In (1 e 1 (1 able II) the ob truction followed the u e of the cautery but was combined how ever with dilatation and curetta e and re moval of a specimen from the cervix for biops. In this in trace the use of the cau ters alone cannot be con id red the etiolo ical factor In the aged as was pointed out by (ellhorn senile vaginiti may occasionally lead to the formation of ob truction in the vagana As the epatients have usually pa sed themenopruse hematometra andhamatocol pos re ult only in ome pathological proces such as tumor which a producing bleedin

In the congenital type the obstruction is almost always complete from the be arriable in the acquired type there is not after quently a period during which the occlusion is not partial. The obstruction may quickly become complete or it may remain indefinitely as an incomplete type.

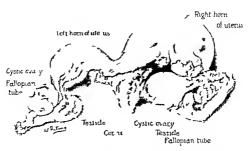


Fig Ca e 11 Hematometra in a uteru did lphy from a case of true bilateral he maphrodi m

Twelve of the a case in the serie resulted from an acquired type of obstruction and 5 of the e followed some type of plastic operation on the cervix (Table II A) In three instance the operation included amountation of the cervix and in two instances it included dilatation and curettage alone and dilatation and curet tage combined with biopsy and cauterization of the cervix. In one instance Case 17 an incomplete type of obstruction followed am putation of the cervix and developed into complete obstruction after the application of radium. In three instances, trauma incident to miscarriage or labor was responsible for the onset (Table II C) In Case 21 there was slight hematometra which had not produced symptoms it was noted incidentally in a uterus that had been removed for complete prolapse in a patient aged 62 years Obstruc tion was the re ult of a submucous fibromyo ma situated at the internal os, combined with the reduction in the size of the lumen of the canal which is part of the normal involution ary process occurring after the menopause In this case degenerating fibromyomata in the fundus were re ponsible for the bleeding. In and , the cau e of the stenosis was not apparent (I ig 8)

Symptoms The age at which symptoms develop in the acquired type of obstruction is considerably greater than that at which they develop in the congenital obstruction the average age in the former being 3612 years

and in the latter puberty. The oldest patient in the scries was aged 6. After the meno pause obstruction developing at the cervity produces hydrometra rather than humatome tra-unless there is bleeding from neoplasm in the fundus or from degenerating submucous fibromyomata as there was in this instance

In the acquired types the patient gives a history of previous menstruation and usually dates the onset of symptoms from the occur rence of some one of the etiological agents mentioned. Since the obstruction is usually at the cervix himmatocolpos with its accompanying urinary symptoms is usually absent. The character and periodicity of the pain is similar to that in the congenital type but it is often less severe because the obstruction at first is likely to be incomplete and because the uterus at this period in life is more completely developed and more readily discussible than at puberty.

If obstruction is incomplete the small opening which persists acts as a safety valve the fluid is retuined within the uterus until the pressure is sufficient to force it through this opening. Since only a small imount of the fluid can expect a time while the reserve within the uteru is regularly replen ished by the menstrual flow the result is an intermittent or continuous discharge. This is as ociated with periodic attacks of pain and enlargement of the uterus typical of the complete type of obstruction. The discharge often



Fg 8 Ca Thutru and d fom pt nt with ham t m t ft etra l Ltol gy not df tly tall h d

acquires an offensive odor the result of infec-

The general health of the patient remains unimpaired unless the symptoms are of unusual seventy or prolonged duration, when there is weakness and loss in weight. If infection develops there is elevation in temperature and pulse rate and increase in the number of leucorates.

DIFFERENTIAL DIAGNOSIS

Dysmenorrheet from other causes but especially the idiopathic type may be con fused with humatometra. In no instance should hematometra be diagno ed unless definite obstruction can be demonstrated in some portion of the lower part of the genital tract and unless enlargement of the uterus can be demonstrated either persistently or intermittently in association with the attack-of pain. It is further e scrittly for a diagnosis of hiematometra, that the retention of an appreciable amount of blood within the uterus be demonstrated at the time of operation.

inadequate and recurrence was frequent Furthermore incomplete and often prolon of dranage not infrequently resulted in ascend ing infection of uterus and fallopian tubes and sometimes extension into the pentionel cruty with the development of fatal pento miss. It then gradurily came to be reconized that this method of treatment was only applicible in certain types of cases and that in mmy instances more radical measures were not only necessary to accomplish a cure but safer.

In young patients especially at is desirable of possible to employ conservative measures in dealing with the pelvic organs. Unfortunately in the younger patients with himselve metal the obstruction is practically always congenial frequently involving a large part of the vagina or is associated with other anomalies which make conservative treat ment difficult or impractical.

In uncomplicated cases of hamatocolpowith or without hymntometry in which the obstruction is due to imperforate himen or persistent membrane across the vagina free incision with irrigation of the cavitie is the treatment of choice. In the uncomplicated cases which re-ult from subtotal con ental atresia in which the uterus and cervix have developed normally and are attached to the 17.1111 the drunge operation is also appli cable. If conservative treatment fail if in fection is pre ent or if the uterus and cervit have not developed normally or are attached to the vagina by a fibrous cord only hysterec tom; should be performed and later in life should it be indicated a plastic operation can be performed to make a vagina

In the presence of harmato alpinx on one obth side conservative treatment by a inal drainage is attended by added risk becau cof the danger of rupture of the tube if it anchored by adhesions. As was pointed out by Carville and others in contractine down when thus rapidly or each of the uteru may produce sufficient on the dit tended on the dit tended.

anchored tubi

TABLE I —HAM \10COLPOS HAMATOMITRA AND HAMATOSALPI\\ RISULTI\G I ROM CONGL\IT \L T\PIS OF OBSTRUCTIO\1

	CONGLNIT IL TYPES OF OBSTRUCTION ¹							
_	A C ngential septum or imperforate hymen							
U	Ag	J i	C 11t	Tr tm t	R It	C mm t		
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				nal atresia				
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C Miscellaneous group								
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TABLE II -HTM (FOMER A AND HTM ATONALITY TROM ACQUIRED TABLE OF OBSTRUCTION

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T \BLI II -Continued

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3	58	Month of the property of the second of the s	I I	`	Do 1f m m f th thyr d	Olft ltddfill th Idbld

pletely and as a source of prolonged draininge into the uterus and vagina remain as an open pathway by which infection may enter the peritoneal cavity. In the presence of hemato salpiny therefore and if the exact degree of development of the organs is not evident or if their exact relationship cannot be accurately determined beforehand abdominal exploration should first be performed in order to determine the feasibility of vaginal draining

More complex anomalies offer individual problems in treatment. Uterus didelphys is probably the most amenable of these anomalies to plastic surgery and when one side of the uterus is normal resection of the obstruct ed portion offers a good prognosis from the standpoint of the preservation of the men strual function and the possibility of future pregnancy. This type of operation is attended by small operative risk. In the one case of hermaphrodism in the series complete hyster ectomy offered the only choice of treatment

In the acquired type of obstruction the principles involved in the treatment are the same except that radical operation may be more readily employed when the patient is approaching the menopruse As a rule if humatometra is slight and uncomplicated and especially if the obstruction is of the in complete type dilutation of the stenosis suffices

In selected cases following drainage of the utrus in this manner chemical hysterectomy as described by Masson and Loucar would insure against recurrence and eliminate any associated intra uterine infection. This procedure is e peccally applicable if patients are near the menopuse or if there is per istent discharge provided however there is no

involvement of the fallopian tubes. The uterus must first be returned as nearly as possible to normal size. If involution does not take place spontaneously after drainage it may be uded by the use of ergot and hot irrigations.

PROGNOSIS

If hematometra is allowed to go untreated a huge accumulation of fluid may result According to Frank more than 3 shiters have been recovered although the amount usually present varies from a few hundred cubic centimeters to 15 liters. With such an accumulation the pressure may become so great that spontaneous rupture occurs at the weakest point often the site of the obstruc tion However the opening soon closes and there is either recurrence of the homato metra or pyometra develops Spontaneous rupture occurred in Case 15 in the series and this complication has been reported by vari ous observers. In some instances rupture has taken place into the rectum the bladder or the labra while in other instances the fluid has found an outlet into the peritoneal cavity through the fimbriated ends of the fallopian

In general it is true that the prognosis im proves as the surgical treatment becomes more radical. In selected uncomplicated cases however the conservative type of treatment is followed by excellent results as to general health and the continuance of menstrual function.

The possibility of pre, nancy occurring after hamatometry remains questionable. Subsequent pre, nancy has not been observed in any of the patients in this series, and we have

TABLE II - HEMATOMETELL IND HEMATOMILING LLOW ACOURT D. T.

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Ail th	pt t the p m	d pt t d	3		

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The possibility of pregnancy occurring after hematometra remains questionable. Subse quent pregnancy has not been observed in any of the patients in this series, and we have

not been able to find any ease reported in the literature in which it has occurred. It eems probable however that subsequent pregnancy should occur in cases in which the uterus is returned to its normal condition prior to the menopriuse and in the ibence of prohibitive congenit il malformations.

GENERAL DISCUSSION

The fluid contained within these critics varies somewhat in character depending in the age of the patient and the site of the obstruction. If the obstruction is at the outlet of the uterus, the retained fluid consists of the products of menstruction in congenital atresia before puberty mucus may some times occumulate in large amounts. Miter the menopause of the accumulation of blood in the result of some dierse process within the result of some dierse process within the surface.

If obstruction is in the vagina, the cervical and vaginal glands contribute their secretions

Prof to operative interference the fluid is usually sterile. Bell studied the chemical composition of hematocolpos fluid from two cases and found that the calcium content washingh but that librin ferments and fibrinogen were lacking.

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Hematocolpos hamatometra and hem atosalping may develop as the result of obstruction within the lower part of the femile genital tract thus preventing the normal escape of the menstrual products or blood from the uterus Such obstruction may be congenital in origin it then usually involves the vagina and may be simple or associated with more complex anomalies of the genital tract. In other instances it may be acquired in which case it usually involves the cervix except in the aged and is frequently the result of trauma incident to parturation or follows plastic operations on the cervix. The acquired type of obstruction may be complete or incomplete

The symptoms are typical There is absence or cessation of the menses coincident with the appearance of attacks of severe pelvie or ab dominal cramps usually occurring about once n month The e attacks of pain tend to be come progre sixely more severe and are asso crated with progressive enlargement of the

The treatment varies with the individual case. The gentral organs should be pre-end during, the childbearing age when the risk of the conservative type of operation is not prohibitive. In the presence of certain compile eations vaginal drainage should be combined with abdominal exploration. In certain cale radical surgical measures should be adopted primarily.

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CLINICAL SURGERY

HOW THE SCIERCE CHINIC OF FROITSON VEHICLE

BILLKOTH I RESECTION OF THE STOMACH

By Dr VICIOLORATOL DI LLR (h t ft f viri

111HOLLH the cully f stomach or lu lenal ulcer is still not letinitely estab h he l Prics r Hilerer gractical ex pen nee which began hen he va an is a tant n liel berg's clim together sith the teachin's of million receirch have e tablished ne fut namely that recett a 1 the oker t gether ath the pyline thirl of the st much a e sentral f r perman ut ure () to it) We may ther fr the eather the Billy the free Bill roth II n cration

Since then II trues in Haberer has a neithered the Bills th I the periti n fehre ind ha uelthi metholin i oo af hi lit ooo re ci tin f the t mali It; als through the use f the Billr th 1 prun n that the be t physi baco and micil relation are rectablished The m st uc e sful immediate in I late results are obtained from this pration high is the shirte tone to tertorm. More ver pupitu jujunal ulcers occasi nally fill withe Billroth II operation and are s onimon after gistro enter st ms and pyl ne exclusin that that type of peration has had to be aban lone l

INDICATE AS LOR OPERATION

All chronic calloused at mach Calri ul and luplenal ulcer which medical treatment has failed to cure permanently should be rese ted Practically every diagn is of chronic callouse! ulcer in air clinic has been confirmed by \ ray by Dr I cb of the /entral 1 sentgen Institut He ha specialized in \ ray f the stomach and duo denum so that he can vs uslize and localize ulcer niches as small a millet seeils

All acute non callou ed ulcers are treated medically

Ul r mpls attons | Lerforated ulcers are re s ctel if | the and if the attent's condition sell permit it. When re ecti n is impossible the ulcers are simply suture lover and jejunostomy alle lif neede! The perit neal cavity is spon ed out an | cl el without drain; (c and ra)

Surgery is lelaved in ea es with acute ulcer hemorrha e and if indicated transfu ion admin 1 tere !

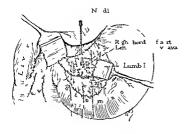
Blol tran fut a together with glucose and in ulin a limini tered intraven u ly i indicated lafore on rative treatment in initients ex an unated from chronic ulcer ham rrha e

Inasmu h a all chronic allowed ulcers are re cted in n Hillerer clinic their mali nant lienerate in which is estimated at about 6 per cent (7) (for 1 repyloric a hi h as o per cent) (15) need not be considered

I eptice jejun il ulcer which cannot always be contirme l'roentgenolo ically are a definite op rative in li ati n Lven in these cas after rilical rese ti n the Billroth I reration should be u el if pos il l'because ther i un ulcer pre h po ition and in occasional cases a peptico rejunal ulcer will recur In the e case it i of great important to include the pyloru in the r e ti n because a similar con hiron to palone es lu 1 n 1 otherwice table he i (5 6 9)

After a gastra enter tonis many case with ut jepti ojejun il ulcers still l ive symptom il the original ulter 1 not heal 1 and eq to the ther lapar t my In the case a Billroth l I he after the gastro enter st my has been s parat 1

The Billroth I I plim f th tomah anastomo i is as a rul ii d'after the most radical I he luodenum 1 re ection for extensoma generally not any lyelly the carcinoma and even with a subtotal stomach resection the Billroth I can be completed easily. The rapidity with high the op ration can b finished is (I great value to the cachectic carcinoma patient \s there i



Fi r Splanchnic and thesia I iver r tra t l up a d by the liver ret actor Stomach pulled down Point of the n edle upon the spinal column with the aorta push d to the ri ht

little danger of postoperative homorrhage the submucosa homostatic sutures may usually be omitted. The serosa must be very exactly sutured because the adhering ability of the peritoneum is mirkedly reduced in carcinomatous patients. I his danger is honever equally great with the Billroth II operation.

PRE OPERATIVE PREPARATION

The patient should stay in bed at least 5 or 6 days prior to the operation. Whenever possible symptoms of acute irritation should be allowed to subside. The stomach is empitied the might before the operation and again immediately before the operation by means of an extreme Trendelenburg position which allows complete emptying of the stomach through the stomach tube. Hermorrhage contra indicates this procedure but perforation does not. One hour before the operation y centigram of morphine is given followed by i centigram of morphine and i centigram of atropin three quarters of an hour later.

OPERATIVE TECHNIQUE

I Anasthesia and opening of the abdomen Subfascial and subcutaneous infiltration with ¹/₄ per cent tutocain is made along the costal mar gins and then down to the umbilicus. After the abdomen has been opened Braun's splanchnic anasthesia is obtained by injecting 80 to 100 cubic centimeters of ½ per cent futocain [14, 10].

Ether anæsthesia is used when especially de sired by the patient or if the patient is young or evattable (3) The most evact hæmostasis is essential in opening the abdominal wall

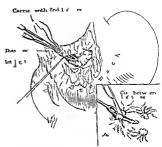
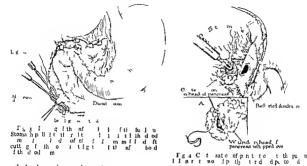


Fig 2 Li ation of the left gastric artery Stomach pulled down lesser omentum split by sealpel, liver pulled upward by retractor dissector pushed into the slit in the lesser omentum th n out elevating the left gastric artery and vessels alone the lesser curvatures upon the dissector ready for figation

2 Exploration of the case The stomach and duodenum are examined carefully but without tissue damage adhesions of the omentum covering the ulcer are freed by means of sharp scalped dissection. Firnilly, the posterior wall of the stomach and duodenum is palpated through incisions in the lisser omentum and the gastrocohic ligament. The pancreas gall bladder bihary ducts and appendix are also examined. All large lymph glands are critically considered.

Orientation in the abdomen may become very difficult because the lesser omentum may appear as a shrunken board like loop the hepatoduoden al and gastrocolle ligament may be altered by oedema the head of the pancreas may have markedly swelled lymph glands. Mobilization of the stomach may be limited further by the frequent penetrations into the pancreas as found in 31 per cent of our cases (18) or into the liver and anterior abdominal wall. The entire planning of the subsequent operative procedure depends upon clarifying the situation as found in such cases.

3 Preparation for resection The most essential prerequisites for successful ulcer resections are exact hemostasis and preparation for resection with a minimum of tissue damage. According to Haberer adequate mobilization is and remains most important. The first part of the duodenum and the pars pylonica of the stomach is resected regardless of whether the ulcer is in the duodenum or the center of the stomach. The Billroth I anastomosis is then made possible when the stom



ach duodenum loop is elevated so as to permit ap proximation of the pars media of the stomach and the first part of the duodenum

The blood 'ves els in the lesser omentum and gastrocolc learnent should be ligated with the most careful hemostasis. The main branches of the curvature vessels are first double ligated at the future line of resection of the stomach and duodenum. This will naturally fall cardral to a stomach ulcer and aboral to one of the duodenum. After ligation of these main vessels in ation of the remuning vessels in the lise or omentum and gastrocolic ligament can be insished with surprismanly few ligatures.

As a rule von Haberer bernns the di section where it is the most difficult. In a duodenal ul cer the duodenum is freed first ind in a gastric ulcer the stomach. The pars pylorica is the starting place only in the most difficult cares and then the ulcer is attacked. This type of procedure followed by immediate freein, of the ulcer accomplishes the desired objective in the most rapid fashion. From our extensive eye inence this rapidity makes it the method of choice to be used whenever possible.

The eparation of the le er omentum gastro coloe li, ament and vascular adhesions is a complished by cuttin, between two interrupted lightness. These are introduced through blunt aneurism needles guided by Kocher dissectors of the appropriate size modified by you Haberer By this technique of multiple interrupted h a tion it i possible through sharp sculpel dissection to free quickly the non vasculated purts of

lesser omentum of gastrocolie ligament as well as the firm adhesions which usually he in the hepatoduodenal ligament or anterior duodenal wall \aturally the method of procedure will vary according to altered findings. When per foration has not yet occurred the stomach is readily pulked down and the lesser omentum incised in the pars flaccida. The left gastric artery is doubly he ated at the level of the stomach cor responding to this incision in the lesser omentum through which the right gastric artery can also be reached to be li ated. Then the pentoneal overing of the lower border of the duodenum is incised From this starting place the inferior ed e of the pars superior and horizontalis of the duo denum are dissected free by keepin close to the duodenal ed e The small Haberer sound is u ed to isolate se ments which are h ated separately The pancreaticoduodenal arters on the head of the pancreas is still not ligated and is cau ht near the stomach antrum where it arises from the ri ht The left gastro epiploic eastro epiploic artery arters is ligated after the gastrocolic li ament is severed To tie the remainder of this li ament usually require but a few h atures

When a duodenal ulcer 1 present and the hepatoduodenal h ament is indurated it 1 above all essential to employ wide di section of the s perior duodenum. Only through this tep can enough normal duodenum he freed from the contracted periduodenal adhesions to suffice for the proper execution of the Billroth I operation. The anterior wall of the duodenum is freed by

sharp dissection of the adhesions. This permits the duodenum to climb out of its indurated adhesions so that its superior and inferior circum ferences can be freed in the typical manner already described. Finally, the posterior surface is prepared and here normal serosa is an absolute prerequisite for the Billroth I resection.

When a stomach ulcer penetrates into the pancreas the stomach and duodenum are first freed above and below the ulcer so that only the site of penetration into the pancreas remains adherent. The adherent perforation is then burned out of the indurated pancreas by a platinum cautery care being exercised to avoid if possible opening the ulcer. The resulting pancreatic callus is then covered by suturing it over very carefully with the pancreas should be very carefully avoided. In cases of this type the ulcer may be opened earlier. This may be done without danger provided the adjoining tissues are valled off.

A similar technique may be used in penetrations into the liver colon or the anterior abdominal wall ie cauterization of the base of the ulcer and exact suturing over of the serosa at the site

of perforation

4 Resection and anastomosis The instrument used is a double clamp which has been developed in you Haberer's clinic (r4) It consists of a stomach and a duodenal clamp which are beld in the desired relation hip by a third clamp. The suture material is fine silk for the seromuscular lavers and fine catgut for the mucosa. The posterior serosa is sutured by very small semi-circular needles—the so-called Biliroth needles which are slightly larger than the needles used for blood vessels in addition. Kader needle holders of two different sizes and copper flexible retractors of varied size are used.

The duodenal clamp is fastened just distal to the ulcer on the freed healthy duodenum. If there is the slightest doubt that an ulcer may still be present further down on the posterior duodenal wall the clamp is not locked until the duodenum is opened and its condition definitely established. However as will be later demon strated the duodenal clamp is not used in many cases and only through the omission of the clamp is it possible to approximate and suture after radical resection.

The duodenal end of the stomach is clamped with a soft Doyen clamp to avoid any spilling of its contents. The peritorical cavity is then carefully walled off and the duodenum is severed with a cautery about 34 to 1 centimeter from the

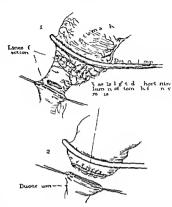
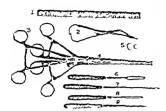


Fig. 5. Remo al of the duodenum. The stomach closed above the pylorus by a Doy en claim? Two stays tures in the duodenum are held I y forceps, and the fre duodenum is elevated. The anterior wall of the duodenum is already been opened by the cautery. Inspection of the posterior duodenal wall with the ulcer already export a Billroth I showing the suture of the posterior wall as the catgut hemo taits sutures.

duodenal clamp the pylone stump is the covered with a laparotomy sponge after elevtion of the stomach the stomach clamp is fasten in the regions of the pars media sliding the clam from the greater curvature toward the lesse the two clamps are next united by the third withe stomach extending out over the left bord of the abdomnal meision—toward the surgeon right—so that the posterior surfaces of its stomach and duodenum may be widely appromated.

As a general rule it is possible to stretch if duodenum wide enough through stay sutures a its inferior and superior edges to fit the tran verse cut of the opened stomach. The close approximated posterior seromuscular interruped sutures are next inserted, the fine Billioth needles and the small kader needle holder bein used. The seromuscular layer of the posterio wall of the stomach is cut about r centimet away from the row of Lembert sutures down it the submucosal blood vessels which are ligated by interrupted catgut suture ligatures. This pricedure decreases postoperative fremorrhage.



F 6 Sr l trum at a li) II f t II b fo g ruto Th do! l hmp f faid k hr o i w th a ura madi m t i nedl u u lly u df ut agth r ul l tm l lt b p mat ofth i trug m h ph t sob d

catgut homostatic sutures of von Haberer are very similar to the himostatic sutures used by Heidenbain in trepynation. They harrow the lumen of the stomach so that it becomes possible to do an end to and and tomests with the duode num even in those case which in the be-inning presented a marked disproportion. The suture yet left lon.

the stomach is then moved to the nationt's right over the taut hemostati sutures which are covered by a lap sponge and a flat a centimeter retractor to pres at their becoming entan led in another Daven clamp later used muscular layer of the anterior wall of the stomach is now incis d is was the posterior will. This incision is about 3 to 4 centimeters from the son Hal erer tomach clamp It is important here to be far enough away from this stomach clamp so that their remains sufficient anterior wall of the stomach to permit the in ertion of the final layer of anterior wall Lembert sutures vithout ten sion and without the nece sity or removin the stomach clamp The submucosal blood vessels are ligated by interrupted catgut sutures in the same manner as vere those of the posterior vall

The stomach seement to be rese ted as net closed by another Doven clamp on its oral border and sev red by electric cautery between the two clamps (von Haberer stomach and Doyen clamps) about 4 millimeters aboral to the hemostatic sutures. This is done by first burning a little let in the mucosa through which an anatomical forceps is inserted into the stomach lumen and then the mucosa of the antenor wall cin be easily burned throu h between the spread blades of the forceps without injuring the adjacent

tissues. The stomach is again turned over to the left and a flat retractor is inserted into the stom ach lumen against the still remaining mucos of the posterior wall which is burned throw his thirt the resected segment is free. The catgut hemostatic sutures are now cut

I set the posterior and then the antenor walls are sutured by a continuous catgut suture which includes all of the layers of the stornach and duo denum the beginning and end of this suture are it together.

The anterior scromuscular suture line is conpleted by interrupted silk sutures which see to over unaginate the duodenum with the serouscular layer of the stomach. I maily the duodenum fits into the stomach as the stalk damushroom fits into its pileus. This end to-rid Billroth i anastomosis with all of the stomach furner entering into the anastomosis is generally over two fin erbreadths lon but we have near

seen stenosi It a only rarely possible to complete the anastomosis with both clamps in the As a general rule it is necessary to remove the duodensi clamp in order to be able to finish the anterior seromuscular suture. In a certain percenta e of cases the duodenal clamp must be removed after the duothnum has been stretched to match the stomach lumen by the superior and inferior stay sutures so that the posterior serosa sutures can be inserted. In many cases the duodenal clamp must be abandoned Here before the duodenum s thet opened or cut the two stay suture are enserted and held tautly el vated to present spiling of the Juodenal contents. Moreover any pte sure upon the duodenum must be avoided 5 Cl ue fil abdom n The abdominal nall is closed in layer the periton um by continuous silk the fas in 1 ith interrupted silk and the

slin s ith clamps 6 End to side modifi ation of the Billroth tech nique (Haberer Mouniha i) In those cases in which it is impossible to obtain a good serosa on the posterior duodenal surface the Billioth I operation a contra indicated Instead the duo denal stump is buried by being covered with two to sof sutures the first bein ontinuou cat ut follo ed by silk Lembert sutures which include the pancreatic capsule in covering the duodenal stump Th re now still remains the po sibility of obtaining the advanta es of the Billroth I anastomosis by utilizing the end to side von Ha berer modification Th duodenum is mobilised markedly by means of the cutting of the pen toneum laterally and to the ri ht of the pars descendens of the duodenum (vent cava is now exposed) Then the transverse cut edge of the stomach is anastomosed to the pars descendens of the duodenum with two rows of sutures either

terminolateral or end to side

End to side anastomosis is contra indicated in many cases because of dense adhesions or unfavorable position of the head of the pancreas. The antecolic Billroth II resection together with a Braun's entero-anastomosis then becomes the operation of choice. Because of limited space it is madvisable to discuss further the modifications of the Billroth I technique which may be needed in ulcers of the cardia. In perforated ulcers in hamorrhage or other complications.

POSTOPERATIVE TREATMENT

After operation nothing is given by mouth for the first 12 to 36 hours or as long as the patient is nauseated weak tea in very small amounts being, the first food. Thirst is combated by physiological salt solution and glucose per rectum by the drip method. Black coffee is included in these enemas for stimulation.

Patients in sbock or very emaciated or starved patients are given intravenously 50 to 150 cubic centimeters of 50 per cent glucose together with

40 to 80 units of insulin (8)

Hæmorrhage from the stomach after operation bas practically disappeared since we have been using the catgut hemostatic sutures. The patient is kept on a liquid diet for 7 days and remains in bed r4 days About 17 or 10 days after operation the patient is fluoroscoped. In cases of emesis or moderate gastric atony the stomach is washed out Threatened lung complications are treated by forced deep respiration carbon dioxide inhala tions camphor and lobelin morphine is given As a prophylaxis against pneumonia for pain Bier's ætherpsicain afenil and heart stimulants such as digipuratum or digitalis are used Cases of beginning pneumonia receive carbon dioxide inhalations to cubic centimeters of camphor in oil 80 to 800 cubic centimeters of 4 per cent colloidal iron sugar solution intravenously as well as the customary therapy Before discharge from the hospital all patients are given definite dietary directions and are instructed to return for con trol examination once a year

EARLY POSTOPERATIVE COMPLICATIONS

r Pentonius secondary to separation and leak age at the suture line is a rare but usually fatal complication. It is found occasionally in very cachectic patients or may result from digestion of the sutures in those cases in which the pancreas —especially the hidd— has been traumatized by

faulty technique Separation of the suture line in Billroth I secondary to excessive tension can be avoided if the duodenum is properly prepared and if the operative indications are care fully applied

2 Subphrenic abscesses and empyema are much less common after a Billroth I than after a Billroth II operation These complications are curable if diagnosed early enough and drained

- 3 The most common complication is pneu monia which occurs just as frequently after local as after general anasthesia. Its etiological basis may be either an existing bronchitis bronchiec tasis or tiny lung emboh Prophylaxis consists of minimizing tissue damage and limiting eviscration with resulting cooling of the intestines Gangrene of the fung which may follow accidental aspiration during general anæsthesia is treated by salvarsan
- 4 Prior to the use of the hæmostatic sutures of the submucosal blood vessels hæmorthage was relatively frequent but it has now practically disappeared Treatment consists of abstinence from food ice bag to the stomach irritation of the stomach with from 10 to 20 liters of 1/2 per mille lapis solution calcium gelatin and serum or blood transfusion
- 5 Brown atrophy of the heart from chronic malnutrition may lead to failure of the circulation its existence can only be suspected but not definitely diagnosed in exsanguinated patients or those who have suffered from chronic ulcers for many years

6 Fatal emboli did not occur in this series of cases

7 A mild postoperative parotitis will occa sionally occur after gastric resection for ulcer

LATE COMPLICATIONS

The following late complications may be decreased by the use of the Billroth I type of resection

r In cases of resection in which there are multiple ulcers (rz) of the duodenum it is easy to overlook one which leads to the so-called apparent recurrences Careful anatomical exploration which is possible in the Billroth I resection will decrease this oversight and eliminate the

apparent recurrences

2 The scar recurrence is found after the Billroth I resection when the duodenum used in the anastomosis is either pathologically scarred or the ulcer not completely healed Proper eval uation of the anatomical findings at operation will limit the Billroth I resection to the indicated cases and eliminate this error

3 A small percentage of patients complain of so called small stomach but as a general rule the early postoperative rapid or precipitate emptying of the Billroth I stomach stump is gradually replaced by normal stomach emptying

There was a 4 to 5 per cent postoperative mor tality and 96 per cent cures in a series of over 1200 Billroth I resections which included all difficult cases and patients of all ages (11)

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FROM THE ORTHOPEDIC SPRVICE MASSACHUSETTS GENERAL HOSPITAL

ARTHROTOMY OF THE HIP

BY ATHANIEL ALLISON MD F 1 (S BOSTON

THI hip joint is deeply placed and is sur rounded by numerous muscles. The psous and ilacus are in front of the articulation Behind it are the quadratus femoris the obturator internis the two genelli and the pyriforms. To the outer side lie the gluteus medius and minimus and rectus and to the inner side are the pectineus and obturator externis.

The hp joint has an exceedingly strong capsule made up of white fibrous tissue which is thickest in front. Itsre enforcing figaments are the strong est in the body and include the iliofemoral the ischiedemoral and the pubofemoral figaments the pubofemoral and the pubofemoral forming what is known as the Y figament of Bigelow. The thin nest part of the capsule lies between the iliofemoral and pubofemoral ligaments and here the joint cavity often communicates with a small bursa which lies below the psons muscle. The hip joint capsule is also weak where it is covered by the obturator muscles.

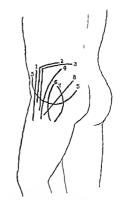
The upper border of the great trochanter is on a level with the center of the hip joint Nelaton's line extends from the anterior superior spine of the ilium to the most prominent part of the tuberosity of the ischume running across the center of the acetabulum and passing over the top of the great trochanter.

The head of the femur hes just below and to the outer side of the central point of Poup irt's light ment

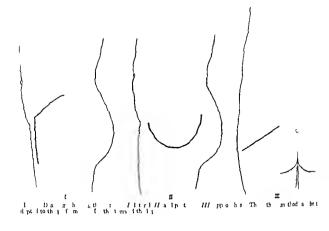
There are descriptions in surgical literature of many different methods of carryin, out the operation of arthrotomy of the hip. The operation bas been recognized as an important one since a remote period of surgical history. The names of such surgicina surfaces as Instranc Sedullot Percy Roux Langenbeck. Lucle Barber Kocher and many others are associated with methods of opening the hip joint. Indeed Farabeuf (1847-1910) assembled in his treatise on operative surgery 18 different methods of performing the operation.

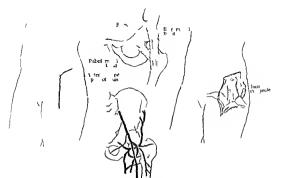
In times past the operation of arthrotoms of the hip was done in desperate haste for desperate conditions. Surgical skill reached its maximum of defitness in doing the operation and considerable pride was taken in stop watch records. The necessity for haste was very urgent for excision of the

hip was attended by terrible mortality. Treves gives statistics collected by Otis in 1891 showing a death rate of go g per cent following gunshot wounds The same statistics show that the mor tality without operation was 98 8 per cent. When amputation was promptly done the mortality was 8, 3 per cent Bryant in 1887 stated that when the operation of hip resection was done for disease the mortality ranged from 15 to 45 per cent. In gunshot wounds death occurred in 9 5 per cent from primary operation in 91 per cent from infec tion and in 90 5 per cent following secondary op eration Present day surgical methods have made the operation less lethal in character and have vouchsafed to the surgeon a greater sense of secu rity than was felt by the past generation. Never theless the operation of arthrotomy of the hip re mains a major surgical procedure one not to be undertaken lightly and one requiring surgical experience and judgment as well as skill and deftness in the handling of tissues

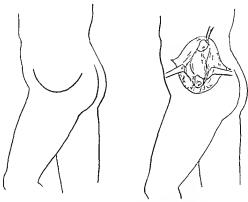


Fir I Some of the approaches to the lup joint I ante rior Spr ng I Smith Petersen 3 and 4 Kocher 5 Oll er 6 Sayre 7 Bryant 8 Oher





Fg 3 Th tro appoh alkdth SmthPt pp h



I 15 4 The lateral approach described by Other

Operations on the hip joint have various objected drainage of an infection repair of a fracture or plastic reconstructions upon the head and neck of the femur or the acetabulum. In some cases it may be necessary to existe the joint or create an ankylosis or attempt to re-establish motion in an inkylosed hip. At times the hip may be fiall or wobbly because of paralysis and a stabilization of the joint may be needed. Other object tries of surgical treatment also may arise. In consequence, several useful methods of approach to the hip hive been devised, and it is of great in portance in each case to select the method of approach which will best allow the accomplishment of the end required.

Arthrotomy of the hip should be done only with the full realization on the surgeon's part of the importance of all the details of operative tech nique and after care. The surgeon must be fully cognizant of the dangers in general and in particular to each individual patient. He must know exactly why when and how the operation should be performed.

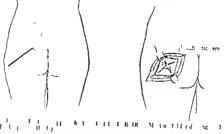
The dangers in general encountered in arthrotomy of the hip are those common to any serious surgical procedure performed upon patients who as a rule are not in good physical condition. Con sequently the operation must be done with reasonable speed and with due regard to the tissues Severe traumatism of soft parts and of home tissue.

must be avoided Surgical shock from trauma and loss of blood are the chief dangers. It goes without saying that operative infection is a most disastrous result insuring always a long period of serious illness with high mortality. Nowhere in surgery are a careful technique and a rigid asepsis more necessary.

As a rule arthrotomy of the hip should be done only for urgent reasons such as prin in the hip or in-bility to walk, or in order to stabilize a tuber culous hip or to drain an acute infection of the joint

If a condition warrants operative interference the operation should be done as soon as possible after the conditions have been properly weighed and studied Satisfactory roentgenograms should be obtained before operation is decided upon

Among the lesions which may require hip ar throtomy are the following acute infections of the hip point tuberculosis of the hip in adults—so-called hip fusion fracture of the femoral neck—reconstruction or bone plastic unreduced trau matic dislocations of the hip arthritis of the hip with painful motion or loose bodies disarticula tion or amputation for sepsis anky losis of the hip so called arthroplasty unreduced displacement of the upper femoral epiphysis obscure arthritis de manding tissue examination congenital dislocation in voung adults or adults and stabilization of the hip in parily sis notably poliomy clitis



Other endits as and varietiens of lesions just menti nel may ilso make it nece sary for the sur geon to proceed t arthrot my of the hip

MITHE

There are three a cful method of approach to the hir is anterer literal and pesteri r and it is important t select the method which will lest tavor that which is to be accomplished after the hit is obcard

We ha of und in the Orth padic Service at the

Mas achusetts (eneral II | it il that the anterior it prouch is best suite 1 to the scenses 1 hip lest in in which a lisarticulation of the fem ril heal is necessary and in which it is a robal le that type of steet listic operation is indicated upon the femeral head or acetabulum or the margins f the litter Therefore the anterior appr ach i t be u ed in the f llowing less ns tubercuksis f the hip in idults so calle I hip fusi n intreduced triumatic dislocati ns of the hip arthritis of the hip with a unful m ti nerl was bodies ankalo is

f the hip so calle farthroplasts concentral lis Licentian in young adults or idults, and stabiliza tuen of the hip in paralysis notably policiny elitis

We have found also that the lateral approach is lest in fracture of the femoral neck-reconstruction or bone plastic and in districulation or am tutation for sersis

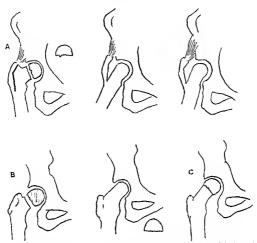
We have made use of the posterior approach in the followin, lessen acute infections of the hij joint unre luced displacement of the upper lem ral epiphysis and becure arthritis demanding tissue e amination

Each method of approach has certain ad an tages in some less as and disadvantages in others for instance the removal of the trechanter major

which is necessary in the literal arproach is not the lest approach for drainage of the joint in acute infections for claious reasons the posterior ap proach is best in this instance Likewise the unterior approach is not advi alle for recon structs in operation in ununited neck fracture be cause in this instance a bone plastic must be done on the greater trochanter Obviously the lateral approach is indicated in this lesion. I urthermore neither the lateral nor the jx sterior approach will give sufficient exposure for I one plastic measures n the neck and head or the acetal ular mar inhere the interior approach is best. Of the three meth d of all rouch it is fur to say that the anterice is the most difficult and damagin next the lateral and least dama in the posterior In consequence it is beyond que tion better to use the posterior approach in all operations done for the purpos of tissue removal for dia nosis and in all attempts to establish drains e in infections of the him

1 RFP \R \TIC \

The present s general condition should be the best possible under the circumstances before oper ation is done. If cossible several days of ret with good sleep should be secured. The skin should be shaved and cleansed with soap water ether and alcohol before the operation. The ordi nary pre an esthetic precautions should be obser ed The skin over the entire hip region should be printed with iodine and the operative field excefully draged with sterile coverings. It is all ways necessary to manipulate the le, and this h during the operation consequently it is essential to cover the patient so that the hip on the side to be operated upon may be move I without dan er



1.15 G. Type of recon tract on operations done for ununited fracture of the femoral needs of all lee operation and B it e Whitman operation. In both of these operation the h ad of the f mur is remo ed. C. Brackett's operation—the fracture d head i replaced on its stump of the neck. Whitman's operation and Brackett's operation both requir tran i lantation of it le f at er trochanter.



In 7 Reconstruct noftl margin of the cetal ulum U fulin 1 lo att nofth lip eithre g gutal reduct par ly 1 ll live from th margin of the cial ulum and 1 lg lout sith a lon tran 1 lnt (Dick s no pritto)

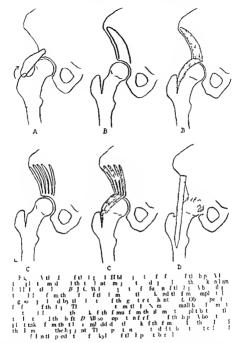
to the technique of operation. This is done by encasing the foot leg and thigh in a sterile cover outside the rest of the sterile coverings so that the operator may grasp the leg and thigh and manipulate the hip without breaking asepsis

We commonly use three methods of approach in arthrotomy of the hip Taking them in order the steps of the anterior lateral and posterior methods are as follows

INTERIOR AIPROACH

There are several methods of anterior approach. The one used by us is perhaps better described as the superior anterior approach and is called by us the Smith I etersen method. A similar method was used by Sprengel in Germany about 100 years ago and later by Anderson in England. Kocher describes this approach for removal of the illum. We call the method the Smith Petersen approach because of his re discovery in 1917 of the value of this method of opening, the hip joint 1

Smith Pi M Am JOth 1 5 g 9 7 5 9



The patient he on his side one third the way over with a long sand long against his back

1 \ curved incision is mide over the crest of the ihum fr in the anterior si me to a little beyond the middle of the crest

A vertical incision is made on the anterior thigh from the anterior sujerior sque of the illium to about 4 or 5 inches downward from the spine

3 These two uts make an angle with each other at the anterior sui erior spine. The skin and

subcutaneous tissue bein, divided the woundedges are covered with skin to all chipped secure by in place

4 The upper arm of this an ular inci ion should be completed first. Beyinnin it the anterior 1 I error spine the incision 1 carried directly do in ward to the bone the on-in-of-the gluteus medius being cut and the prosteum incised. With a sharp periosted elevator the peri-teum is not elevated from the illum the muscles being carried.

with it The depth of the wound is packed with

gauze strips

5 The vertical arm of this angulated incision is completed by the intermuscular planes being en tered between the sartorius anteriorly and the tensor fasciæ femoris posteriorly The fascin is the only structure demanding division and by retrac tion the anterior surface of the hip joint capsule is clearly seen. The capsule should be divided in such a way as to preserve the iliofemoral Y liga ment of Bigelow After the freeing of the capsule from the cotyloid ligament at the acetabular mar gin a vertical cut is made along the border of the iliofemoral band of the Y ligament This expos s the anterior external aspect of the head of the femur By flexion of the thigh and external rota tion the head of the femur is delivered. The exposure thus accomplished gives access to the acetab

ulum and the entire head and neck of the femure 6. The flap is turned back after suture of the capsule the gluteus medius is stitched to its pen osterl attachment and the anterior line of suture is closed in layers.

LATERAL APPROACH

The lateral or Olher's approach in which the hip from the region of the great trochanter is opened was recently advocated by J B Murphy'as a proper approach for arthroplast of the hip Lever also advised this manner of approach to the hip for arthroplast. Baer has used it as the method of choice in his operations for re establish ment of motion at the hip To us it seems less suit ed to arthroplast; than does the anterior approach because of the necessity for fracture at the region of the greater trochanter

The patient lies on his side with the thigh flexed

to 45 degrees

1 A curved incision through skin and subcuta neous fit is made starting at the anterior superior spine and running to the posterior superior spine. The curve is flat. U shaped with its lowest point about 1 inch below the tip of the greater tro chanter. The flap is turned upward exposing the tip of the trochanter. The aponeurosis of the gluteus maximus is divided vertically and retracted backward.

The trochanter major is now cut through about r inch below its tip. The direction of this osteotomy is oblique so that the upper end of the cut is at the upper surface of the femoral neck. This detached fragment is pulled upward and car ries with it the muscles which have insertion at the greater trochant r ie the gluteus medius gluteus minums pyriformis and gemelli

M phy J B Ath of ty goo



Fig. 8a Ro ntgenogram showing bone tran plant taken from the tibia and planted in the ilium and f mur across th hip joint as described by the author

3 The anterior margin of the gluteus medius is dissected from the posterior margin of the tensor fascre femous. This exposes the upper surface of the joint capsule and the acetabular margin.

4 The capsule is divided vertically and the head of the femur dislocated by adduction and

internal rotation of the thigh

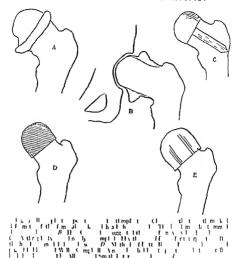
5 The fragment of the trochanter is sutured in place either by catgut stitches or a bone pin. The muscles are sutured together by interrupted sutures. The skin is sutured with silk, either an interrupted or continuous stitch being used.

The lateral approach is admirably suited to removal of the head of the femur in old ununited fractures especially when some type of reconstruction is to be done as in the Whitman or Brackett operation. The reshaping of the neck and trochanter region is more easily accomplished. It is less damaging to the hip region than is the anterior approach it requires less time for exposure and consequently is advisable as an approach in patients of advanced years or in those of poor physical condition.

POSTERIOR APPROACH

This method has been described by Ober and is called by us the Ober method. This approach is not desirable in conditions in which exposure of the head of the femur is required. Its use is for drainage of the hip joint or removal of tissue for examination and dragnosis. Ghormley has recent h used it for replacement of shipping of the upper femoral epiphysis with good result. Langenbeck

Ob FAPt Ath tmy fth Hp JAm VI \s



an I K. her have described somewhat similar ap

a the justient lies free d wh on the table. The butteck and upper thigh are prepared for per att n

2 In 14 n is made in a straight line running from the 1 terier lateral supect of the femur obliquely in viriand brekward toward the ster coccygell reticulation directly over the neck of the femur in lain the line of the fibers of the gluteus maximus.

3 The filers of the gluteus maximus are separated

4. The und riving fat is pushed aside by blunt disject in care being used to a if the ir at scatte mer which issue the region of the metal extremity of the inic ic n. The tendon of the obtivator in terms the quidritus firmers and the general mid pyriform ir now caposed in 1 cyprated by 1 lunt dissection and retracted to expose the 1 os terms under cf the inic cipsule.

5 The joint cip ale is divided the whole lengt f the treesion and drains e or removal of table

is acc implished

6. In order t infunction drains the capsule
may be sutured to the plate of fascial or expande
drains may be statched to the cap what may may

10. Statched to the cap what may may be statched to the cap what when the cap what may be statched to the cap what when the cap when the cap what when the cap when the cap what when the cap when

7 Ck sure is simple requiring approximation of the edges with catgut situres. The skin i utured with silk.

LOSTOPIRATIVI CARF

After irthrotomy of the hip the 'ur' on should always by e in min I the drager | surgical shock | The patient as iride should's handled a thou h surgical slick were pre ent a shock enema a warm I ed morphine in sufficient quantity and lorce I fluids are I et empleyed in cich instance.

Lich different c ndition require a particular tipe of after our in general when motion at the hip is the object of the operation to a arthroplast or drain; c of infection the hip should be jut up

in overhead suspension so that the patient may move it as soon and as much as possible without pain

In all procedures in which bony union is sought especially in fusion for tuberculosis or in fracture of the neck of the femure the hip should be fixed in a plaster-of Paris spica. It is often advisable to include the thigh of the opposite side in the plaster dressing in order to fix the hip.

Whenever arthroplasty of the hip is done and indeed for whatever purpose it is done it is nec

essary for the patient to be recumbent in bed for a considerable period of time. Consequently good nursing care is essential, both for the period of bed care and for the long period of re adjustment when the patient is up with crutches seeking to re establish function.

The prognosis depends entirely upon the condition for which the operation is performed. Each lesion carries with it certain unfavorable poten talities which result as a rule in more or less per manent impairment of the hip joint function.

GASTRO-ENTEROSTOMY WITH A TRANSVERSE JEJUNAL INCISION

PRELIMINARY CLINICAL REPORT

By THEODORF S MOISI MD NW HAVEN CONNECTICUT

F mith Den im if D lil in bool Med and b S goal Cl I th New II

nd b S gotal Cl fth New H H ptal N w H

LTHOUGH the success of any type of gastro-intestinal anastomosis is largely dependent on its mechanical efficiency there are certain faults inherent in the motor mechanism of gastrojejunostomies performed according to the orthodox methods shortcomings are in large part due to the longitudinal jejunal incision which severs the circular muscle fibers and interferes with penstalsis throughout the length of the stoma This in sufficiency of the motor mechanism after the usual procedures suggested the probable supen onty of a different type of anastomosis whereby a minimal amount of injury would be inflicted upon the circular muscle fibers of the intestine This can be effected quite easily by the u e of a transverse jejunal incision

The mechanics of the orthodox side to-side gastrojejunostomy have been the subject of an extensive experimental study by Cannon and Blake (r) These investigators repeatedly noted that food was forced through the patent pylorus to re enter the stomach via the proximal loop. This circulation of food was seen when the stomach was tretched by large amounts of food or water They explained this phenomenon by the valve like action of the anastomo is. When the wall of the stomach is stretched so that the edges of the opening into the jejunum are eparated the intestinal wall becomes flattened over the stoma and the openings into the intestine become merely narrow slits (Fig 1) The opening on the prov imal side of the stoma permits food which cir culates via the pylorus and duodenum to return into the stomach but both slits offer a valve like hindrance to the egress of food from the stomach via the stoma. The more the gistric

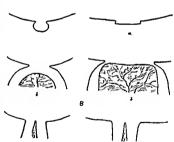
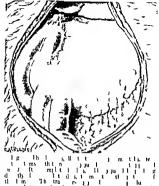


Fig. 1. Valagram showing the effect of atterme ga traditation on the toma A in the u and u to deg. In entero tomy (loor-tudinal jejunal inci ion) B in the utrpe of procedure (transverse jejunal inci ion). The nor mal stoma u represented in the usual proc dure in a and b in cross ection and longitudinal section u pectic ely and u represents a longitudinal section in pectic ely and u represents a longitudinal section in pectic ely and u represents a longitudinal section u pectic ely and u represents a longitudinal section u and u satisfies a longitudinal sense represents a longitudinal sense represents a longitudinal section u and u and u defined in u and u and u and u which in u the dilatat on u odder u and u which in u the dilatat on u odder u end regement of the stoma

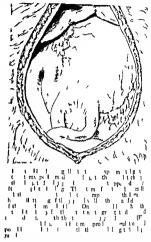


dity fit distinct the permitted of the fit o

will is stretched the more effective the values lecome. This phenomenon wis also demonstrated in the excised stomach by distending, it with water. Moreover the division of the circular muscle filters at the stoma in the usual side, to side gastrojeunostomy makes it impossible for peristalisis to be effective at the nigulation in the igunum at the distal end of the anistomosis and hence the force that normally pushes the food along and straighters the kink is fickling.

Various modifications have been suggested to jejunostomy. Kelling (3) thought that kinking was produced when the stoma was made too large so that when the stomach was stretched and the stoma further enlarged a spur of intestine might project into the gastne cavity. Case (2) suggested that kinking might be entirely prevented by at taching a few centimeters of jejunum beyond the distal end of the stoma to the stomach will distal end of the stomach of the stomach will distal end of the stomach will be stomach will distal end of the stomach will be stomach will distal end of the stomach will be stomach will be distalled to the stomach will be stomach will be distalled the stomach will be stomach will be

Moise and Harvey (6) described a method of gastro intestinal a mastomosis after a partial gastrectomy wherein the jejunum is incised transversely rather than longitudinally and the end of the stomach is anastomosed to the end of the jejunum. The advantages of such a procedure over the usual end to side or side to side anastomoses are several. The procedure is an end to



end anastomosis and should have the mechanical and phast logical whanh as that are generally conceded for this type of operation. In contrast with usual method one avoids cutturn the reliar muscle it ers and accordin ly there is no interference with peristalists and no opportunits a alforded for the formation of an atomic diated pouch opposite the storm. After this end to-end gastropyunostomy, the two jejunal loops naturally gravitate downward, which is the optimum position for the maintenance of a patient stomawhile this same tendency for the loops to drop down after the Polya anastomosis may tend to kink and partly occlude the lumen.

In a liter communication More Has ensent and Vogt (7) reported a comparative study between a series of gristrog-juno tomies in do with the orthodox longitudinal jequal and ion and a similar series in which a true verse jound incision was utilized. The operative technique the size and placing of the stoma were idential in the two series. The functional results in the ten end to sude anastomoses (trans erse jejumal ten end to sude anastomoses (trans erse jejumal



I ig 4. The drawing illustrates an instance of a dibit of stomach after the u ut] agastro enterostomy, (longxitudinal) jumal ia i ion) with the alve formation described by Cannon and Bil &c. There i mo lerate angulation of the igiumal loop at the distall end of the anastomosis. The bostruction and concommant stal a rare due to this alve form tion and angulation. This was observed in several i tances (a in ro) with the u ual ga too enterostomy with longitudinal joyunal inci on but in no instance—ith a trans er e jegunal incision.

incision) were uniformly good. The reentgeno graphic studies showed that the stomach usually began to empty immediately after feeding. The emptying was never precipitous. The average emptying time for the series was 5½ hours which is approximately the same as that of a normal dog under similar conditions. In animals without pylone exclusion the emptying was via both the pylorus and the stoma.

Finally examined in situ the anastomoses looked much as they did upon completion of the operation. The stomach was not er dilated. The loops of jeginum hung directly downward in the ideal mechanical position (Fig. 2). There was no evidence of valve formation or kinking Upon removal the specimens showed patent lumina about the size of a cross section of the normal jeginum.

In contrast there were three poor results in ten side to side anastomoses (longitudinal jejural incision). In the 7 normally functioning anasto

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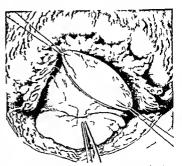
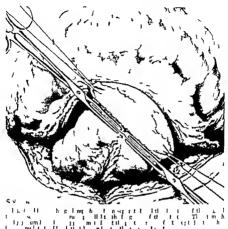


Fig 5 The open g in the transier e mesocolon his bean made. The edges of the opening in the mesocolon lave been sutured to the stomach wall. The two guide sutures indicate the line of the propo cd gistric incision. The crushing clamp have be n applied to the primum and an incision has been made acroot the inte tine leaving a mirgin of one quarter of an inch at the mesenterie bord?

moses the average emptying time was slightly longer than 5 hours (Fig 3) In the poorly functioning instances (3 in 10) there was definite evidence of gastric retention determined by roentgenographic study. In two animals the obstruction progressively became more and more marked and was associated with comiting and emaciation. At approximately a month and a half after operation fluoroscopic chaminations showed that the stomachs were greatly dilated and full of fluid They did not empty perceptibly within 6 hours and after 3 days showed marked retention At autopsy there was marked gastric distention (Fig 4) In each case the stoma was much enlarged and the opposite intestinal wall where the circular muscle fibers had been cut was markedly stretched and ballooned out in line with the stomach wall illustrating the valve formation described by Cannon and Blake

The loops of jegunum gravitated downward from either extremity of the dilated stoma with moderate angulation of the gut at the distal end of the anastomosis. In the third animal a similar though less marked condition was observed. It seems highly probable that the animals took too much food or water thus producing distention with the concomitant valve formation and this condition once established gradually became more and more marked by the accumulation of normal secretions or by the further ingestion of food and water.



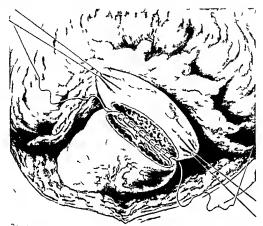
It should be emphasized that there were no adhesions r perminent kinks and that the obstruction c uld be attributed to the formation als the cobervations are in a n trast to the sc (Cannon in l Blake who did n t believe that such valves were entirely resix neible for their failures but state that the development of symptoms of the s called vicious circle (vomiting gastric retention etc.) have been associated in their experiments with kinks and demonstrable obstacles to the free passage of chame They pointed out that under conditions with intact circular muscle fibers shari angula tions in the intestine may be readily straightened out by the force of penstalsis

The purpose of the present communication is to present an operation not entirely new in principle but which in comparison with the older method de clops more completely the efficiency of the transverse jejunal incision. This greater fliciency of the new operation has been demonstrated by chinical and experimental study and is ample justification for its introduction as a clinical procedure

OLIRATIAL TECHNIQUE FOR ICSTURIOR GASTRO JIJE O TOWN WITH TRANSFERSE JEJUNE excision

The stomach tran verse or lon and omentum are turned upw and to expe e the under surface of the trinsverse me sesten as in the usual pro cedure The due lenojejinal junction is located The posterior surface of the stomach i exposed by an opening made through an avascular portion of the transver e me (colon The stomach) delivered and the part require I for the anastomo-SI is located A guide suture is inserted at either end of the proposed incision into the stomach

The line of the gastric inci ion may be selected as in the standard procedures In the cases here with reported the opening was made so that the stoma would be vertically or extend from above downward and to the right at an angle of 45 degrees with the horizontal. The exact line has been selected in each instance so that there wa no rotation or kinking of the jejunum proximal to the anastomosis The opening in the mesocolon is closed by the suturing of the cut ed es to the stomach wall



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I ig The cru hed edg s of the j junal opening ha e been ever ed after remo al of the clamps The continuou nine suture of catgut across the posterior half of the storm has b n complete!

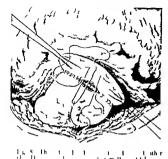
The jejunum is lifted into position for a short loop operation. A point is selected between adjacent straight intestinal arteries and two small crushing clamps are applied side by side extending across two thirds to three fourths of the diameter of the intestine A margin of 1/4 inch is left at the mesenteric border (Fig 5) After an incision is made between the clamps their handles are separated and the direction of the original transverse incision is changed to run parallel to the long axis of the intestine This portion of the jejunum is approximated to the stomach along the line of the proposed gastric incision so that the distril loop will be near the greater curvature A posterior row of interrupted silk sutures is inserted. Care is taken that the middle suture is accurately placed opposite the end of the original jejunal incision (Fig 6) An incision is made into the stomach of the same length as the retunal stoma (approximately 212 inches) The bleeding is controlled with ligatures of fine plain catgut. The crushing clamps are removed and the crushed edges of the jejunum are excised. The anastomosis may be completed in accordance with the operator's preference

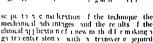
The usual procedure in this series has been to commence in the middle of the anastomosis posteriorly with a No o chromic catgut suture and carry it in either direction as a continuous through and through locked stitch (Fig. 7) suture is continued around the angles as a continuous inverting mattress stitch until the anastomosis is completely closed (Fig. 8) Care is taken to invert a minimal amount on the jejunal side and thus avoid producing an unduly large diaphragm The anterior layer is reinforced with interrupted mattress sutures of fine black silk to complete the anastomosis (Fig. 9) On comple tion of the anastomosis the stomach and trans verse colon are replaced and the distal jejunal loop gravitates downward at right angles to the greater curvature in the optimum mechanical position (Fig 10) The proximal and distal openings are each approximately the size of the cross section of the jejunum

DISCUSSION

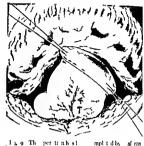
This communication is not concerned with a discussion of the indications for or the therapeutic value of gastrojejunostomy but is limited in its

incision





Although the utilization of the transverse jeiunal incisi n in the performing of a gastro enterest my i n tentirely nev the older meth is fall hort of empletely leveloping jes sil ilities f the trans er e incisi n Mayo (5) in i ios stated In June 1 103 we legan the method of Mikulic making the orening within three r four inches f the origin of the jejunum and using a trans erse meisin. We made firty three by this meth d with four deaths, two of which could le fairly excluded. Four required a second opera tion at our hands and to a large extent because we departed from the originator's technique. It came al ut this way. The trans erse inte final inci ion limits the sile of the opening to one half the diameter of the intestin le's about one fourth inch suture line and the opening could eldom be made larger than would admit the invaginated thumb We tried to enlarge this by encroaching on the bewell and caused a valve to form which turned the bile into the stomach These patients gave us a lot of troul le the short upper limb of the loop made an ordinary entero anastomosis of the two arms of the bowel impossible finally united the intestine each side of the open in, in exactly the same manner as in the Finney operation at the pylorus The result was good This was our first experience with the short



proximal loop the cases which recovered after this method have remained in splendid condition

pt Im tt

lyaro f

nt r la

despite the small opening

I have been unable to find the reference to
Mikuher's procedure but a ume that it i
somewhat similar to the method of Kocher (4)
which is illustrated in Figure 21

According to the procedure mentioned by Mayo the use of the opening a limited to one half the diameter of the jejunum according to Kocher's method the length of the incision is equal to the diameter of the intestine but in the method described in the present paper the len th of the opening obtained with the transvere rejunal incision is practically to ice the diametr inches) The openin of the intestine (about into each loop is approximately equal to the cro section of the jejunum which obviously 1 the maximum possible size of the effecti elumen in any type of unastomos s even thou h a lon er longitudinal incision into the intestine gives a seemin ly larger opening

CLINICAL APPLICATION

The operation of gastro enterostoms with a transverse jejuard incision accordin to the above technique has I een performed in 13 instances including 17 in which the procedure was utilized as the operation of choice and 6 for pilliative relief of piloric ob truction inmain and disease. The 6 cases of inalignance on i home palliative procedures were performed are excluded from the following discussion of results. Among the former group of patients (Table 1) among the former group of patients (Table 1).

In The transver e colon and stomach has e been replaced. The stoma (about 2 / inches long) 1 shown through a window in the anterior wall of the stomacl The dotted lines (diagrammatic) illustrate the position of the proximal and distal loops

re meluded 11 duodenal ulcers (one following an end burn) 3 gastrie ulcers (one of which also had duodenal ulcer) 1 gastrojejunal ulcer and 2 aremomata of the stomach The operative procedures include 14 posterior gastro enter stomies one Billroth II one retrocolic Polya and one antecolie Balfour Polya The results are given in Table I The series is small but should represent a fair cross section of gastroduodenal esions requiring surgical treatment

MOISE

At the present time only the immediate and early results can be adequately considered as the majority of the operations were performed quite recently and sufficient time has not elapsed for in evaluation of the remote results. However as the advantages in the new method are probably largely mechanical it seems unlikely that the remote results will differ from those observed following the usual procedures The best indica tion of the mechanical efficiency of a gastro jejunal anastomosis is the frequency of the occurrence of postoperative vomiting and prolonged gastric retention

The immediate convalescence has been sur prisingly uneventful in the entire series There was no postoperative vomiting whatever in 11 of the 17 cases in 5 there was slight comiting following the operation but complete relief was obtained after gastric lavage. In one case only slight vomiting persisted off and on while the patient remained in the hospital

The functional efficiency of the anastomosis has also been studied by routine fluoroscopie examinations of the stomach shortly before the patients were discharged from the hospital and at later intervals between 2 and 9 months after the operation In a discussion of the immediate postoperative roentgenograms it is necessary to emphasize the fact that a moderate amount of gastric residue is very frequently observed after the orthodox posterior gastro enterostomy This usually disappears after a few weeks and ac cordingly the occurrence of gastric stasis after 6 hours is not significant unless of extreme grade or unless it persists for a long period after opera tion In the present series there was no 6 hour gastne residue in the immediate postoperative roentgenograms in 7 instances in 8 there was sbght retention and in there was a marked gastric residue There was no 6 hour residue in 13 patients on whom subsequent roentgenographic examinations were made at intervals between 2 and a months after operation. Of the remaining four patients one is free of all gastric symptoms (no \ raysobtained) one is dead and two cannot be located

Although the occurrence of symptoms of the so called vicious eircle have been largely pre

TABLE I -GASTEOLARE ROSTOMA WITH THE MASALES JEJUNAL INCISION

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TABLE I — GASTRO LATEROSTOMA WITH TRANSFERSE JEJUNAL INCISION (Continued)

(astri Ulcers (Continued)

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Gastrojejunal Ulcers										
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vented by the general adoption of the posterior no loop procedure not infrequently postoperative complication These symptoms have been attributed to a variety of factors including improper placing of stoma adhesions kinks or twists etc. but it is quite possible that the valve formation observed ex perimentally (ide supra) may be among the more important exciting causes. The severed muscle fibers can have no effect on the forward movement of food as their contraction will mere ly shorten the intestinal wall opposite the gastric opening The course of events may be that the stomach becomes distended with partial valve formation and when this condition is once estab lished unless it is relieved by the complete emptying of the stomach will tend to become gradually wors by the accumulation of the normal secretions or by the continued ingestion of food and water There is clinical evidence of the correctness of this hypothesis in that the majority of such patients are relieved by gastric lavage

which prevents further dilatation of the stomach until the normal muscle tonus is restored. One of the chief advantages of the transverse jejunal incision lies in the fact that gastric distention has no tendency to the formation of a valvular obstruction but on the contrary munitims the patency of the stoma.

SUMMIRY

- r The division of the circular muscle fibers by the longitudinal jejunal incision is responsible for the fruity mechanics of the usual side to side gastroreumostomy
- 2 Å method of performing a gastro intestinal nustomosis is presented whereby the jejunum is incised transversely rather than longitudinally in order to wood the mechanical defects inherent in the division of the circular fibers
- 3 The theoretical advantages of this procedure are several. The circular muscle fibers are not severed and accordingly there is a minimal interference with peristalisis the intestinal loops.



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nto the fat subjacent to it. The clot in this organ is partly robein down. The left adrenal presents the same picture of brmorrhage. Here the mass is contained practically nitriely within the organ In only the upp r pole has it robein into the surrounding tissue. Here the clot is firm to the touch. Definite thromboss of the c ntral vein

s not made out grossly

Microscopic exami at a i Microscopic examination made of sections from the various viscera are all negative except for sections of the kidney and adr nals Microscopic examination of sections of the Lidn vs shows in the fibrous capsule several rather sizable accumulations of lymphocytes and slight hamorrhage. In the super ficial layer of the cortex just beneath the cap ul and in several points of the medulla there are di cr to focal ac cumulations of lymphocytes 1 number of ections were taken from each adrenal (Fig. 3) and sections from uch tissue shows the hamorrhage in the m dullar, portion of the adrenals extending to various degrees into the periph eral fat. In addition a number of large eins show throm botic occlusion. There is no elidence of any new growth associated with the process. There is all o no evid nee in the histology that any infectious process was present Further it should be noted that microscopic as well as the gross findings fail to give indication as to the etiology of the process

One wonders in retrospect whether the vague abdom nal symptoms of 6 years ago were asso inted with tran ent disturbances of the suprirenal gland possibly a mall harmorrhage which was finally absorbed It is apparent according to the symptoms that in the attack which caused the death the right gland was involved fix and the left

gland followed some days later

This type of profuse hamorrhage into both suprarenal glands must be differentiated from the small diffuse ecchymoses and hamorrhagic spots of touc origin occurring during acute infectious diseases. Small toric ecchymoses are frequent massive hamorrhages are rare in children ex

tremely rare in adults

In 1966 Lavenson published an exhaustive yet concise review of the entire subject of acute ad renal insufficiency up to that time. Since then there have been few publications of note in English but among the Germans the works of Lissauer (1908) Materna (1910) Kempf (1918) Freudemann (1920) Freudel (1923) and Brasser (1924) must be mentioned as worthy contributions. Since 1906 20 cases of bilateral suprarenal apoplety in adults have been reported by Munson Laedenck. Garipuy, and Schreiber Lissauer Hektoen Brodnitz Eilbs Valentin Wedman Foster Freudemann Michaux and Marsset Frankel Brasser Kessel Bittoff and Severn

When we search for etiological factors we are struck by the great number of theories advanced which indicates in a way the unsatisfactory state of our knowledge. In tracing the various factors one is tempted to turn to the period at which the condition is more frequent namely in the newborn and in childhood. Kempf calls at tention to the embry ology of these sensitue glands

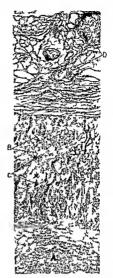


Fig. 3 Micro copic section of affected adrenal. The medullary portion 1 is occupied by a large blood clot which has destroyed all e idence of medullary issue. In the cortex one sees marked hemorrhare inflictation B with destruction of most of the cortical cellular elements the the exception of a few scattered cell columns C. In the peri adrenal fat one sees thrombosis of the vessels in early stages of o gainstation. D Low power

as a predisposing factor in the young. The fusion of the interrenal (cortical) and the adrenal (medullary) anlagen into a single organ takes place very gradually and reaches its full development be tween the end of the first year and the cessation of growth In intra uterine life what is to be the suprarenal gland consists only of interrene tissue in which only a few sympathetic element are included The newborn adrenal shows are outer layer consisting entirely of cortex and r inner layer broader and darker filled with by consisting mostly of cortex except for small and plexes of medullary cells dispersed also -veins In the first month there occur capillary hyperæmia of the inner layer 24 ciated therewith a beginning degeneration

cortical cells From the second month to the twelfth month the hyperæmia is marked and there occurs further fatty vacuolar and colloud degenerative changes in the cortical cells the place of the strophic cells being taken by the medullary cells which ever increase in number as if being table to withstand the pressure of the hyperæmia to which the cortical cells succumb. This process persists to the cessition of growth and evidence of it is even found in adult supraterials. It is this hyperæmia and destruction which kempf claims is the most important pre disposing factor in adrenal hemorrhage in the young and may also play a part in adults.

The truma and circultory disturbances in cident to 1-bir hive of titu been suggested as causes in the newborn vet suprurenal himorrhage is known to occur in cises in which the dehievable bas been exceptionally quick and easy and there are a great number of extremely difficult labors in which these glands have remained intact Some has e also suggested the resuscrition methods of vehults to be resynosible but this has

been dispro ed

In adults many conditions have been advanced as having an etiological bearing. Among these are thrombosis capillary embols congestive diseases infect in and town diseases of the solar pleus surface burns and homorrhage distinguished and the solar pleus surface burns and homorrhage distinguished from the separate of a course of chronic diseases in the viscera in all of which the suprarenal veins were found to be the mlosed.

Lavenson reports the finding of only two cases of acute adrenal insufficiency in which hæmor rhage or necrosis were not responsible one case in which there were abscesses of both suprarenals and the other in which there was sui puration of both suprarenals in a case of Pott's disease. He reports a case in which thrombosis was e adentis the causal factor and suggests that regional suppuration may in some ases eause thrombosis of the suprarenal veins. Thrombosis of the small vessels was also noted ly us in our own case but the large vein was free With Simmonds Laven son Brasser Kempf and others we agree that thrombosis is the most important etiological factor in the production of harmorrhage and necrosis of both adult suprarenal glands. In some cases thrombosis may produce a marked infarction in others only a lesser degree of hæmorrhagic infiltration Simmonds claims that this depends upon the occasional presence of a row of accessory suprarenal veins which empty into the diaphragmatic veins and are variable in size and number

Summonds noted in the cases reported by him that the thrombi in the central veins and librobrinches were definitely older than those in the small brunches and capillaries and concluded therefore that thrombiosis was necessarily the primary causal factor in these cas is the hamor thage being secondary. Were hemorrhae the primary phenomenon the older thrombi would occupy the smaller vessels the larger branches and central vein would be the seat of fresh thrombi or be entirely free of them. Lissuer and Ellis in reporting similar cases accept these views

Some virters have suggested a relation be tween the production of hamourha e and the somewhat unusual vascular anatomy of the suprarenal glands Lavenson and others direct our attention to the fact that the arterial supply coming as it does from three sources is unusually great and that the blood after traversin the medulia leaves at the hilus by a sin le large thin vein which empties on the right into the vena casa and on the left into the renal vein He and others have also noted that the medulla is much more frequently and profoundly affected and that the night suprarenal is much more often the sent of hemorrhage than the left Lavenson su gests that simple alterations of blood supply or blood pressure may therefore be determining factors in the production of hamorrhage especial ly in the newborn Kempf and Brasser even as late as 19 4 in noting the peculiarities of the vascular anatomy suggest that the slowin of the blood current may predispose to thrombus formation in which Brasser thinks infection may play a part

That any consideration of a purely anatomical nature may have an etiological relationship; unlikely in a condition of such extreme rantivet considering that hemorrhage has already taken place the anatomical peculiarities my determine the overwhelming participation of the medulla over the cortex and the right side of extended the results of the left both as to incidence and extent of in

volvement

Arnaud Churton and Dudgeon have reported cases in which supragrenal apoplety was associated with severe surface burns and some have ugested an etiological relationship between the two conditions. Simmonds feels that some other cases were the result of an hemorrhame dustless Virchow claims that diseases of the solar pleus are responsible. In those cases which are associated with convulsions Lavenson swe_ests that the convulsions have produced the hem orrhage rather than the hemorrhage the convulsion Brasser and others suppose that there

may be a constitutional defect in the blood ves sels which predisposes to thrombosis

Dudgeon has arbitrarily divided cases of supra renal hæmorrhage into three groups depending upon the degree of involvement. In the first group the whole glands are converted into blood sacs with occasional extravasations into the surrounding tissue our own case fell into this group In the second group there is a well marked hemorrhage into the medulla the cortex being spared except for a few erythrocytes scattered between the columns of adrenal cells These two groups are often associated with thrombosis of the suprarenal veins and when both glands are affected are usually fatal In the third group there is scattered hamorrhage into the gland substance chiefly in the medulla with little or no destruction of parenchymatous elements This last type is most frequently noted in the acute infectious diseases is not usually the cause of death and is not included by us in the class of

suprarenal apoplexies
That the hæmorrhage beings in the medulla is
noted by many writers. The cortex is secondarily
involved possibly by compression. The relation
between these facts and the vascular anatomy

has been previously noted

It is inferesting to note that suprarenal blood tumors of enormous sizes have been reported. These however are unlateral findings the other gland usually being intact. Roger reported a case in which there was a blood cyst of kilo grams produced by hæmorrhage into a suprarenal gland. Carrington found suprarenal blood cysts the size of oranges. Routier described the case of a man of 32 years who compluned of epigastric pain and vomiting of 3 years duration in which a 1600 gram suprarenal cyst containing changed blood was found. Pawlock, notes a suprarenal cyst of 10 liters Chiari a 3 pound cyst. Such large tumors however are not found in cases of blateral suprarenal apoplexy.

Arnaud recognized three arbitrary clinical groups The first is the so-called perionaed 15pe in which there is usually sudden severe ab downial pain and profound collapse associated with vomiting moderate abdominal distention and mild lumbar and epigastric tenderness. The picture may resemble acute hemorrhagic pain creatitis peritonitis or ileus yet the physical signs are vague and the shock is out of all proportion to them. The collapse usually goes on to coma and the patient dies in a few days in profound depression. Such a picture has lead to surgical interference as was deemed the procedure of choice in the case of Brodnitz who found

nothing but three portions of contracted and animic small intestines each to to 20 centimeters long. At the autopsy the essential pathology was located in both suprarenal glands. Brasser Materna and others consider the abdominal symptoms to be due to the abnormal epinephrine content of the blood and to vary according to whether it is increased or diminished and Pende thinks that they are due to disturbances of the solar plecus.

In the second type called the asthenic type asthenia is the only symptom of note progress

ing to a fatal termination

In the third type the nerrous symptoms dominate the clinical picture. There may be dehrium coma convulsions or a typhoid like state.

To these types Lavenson has added a fourth which includes crises of sudden death in which nothing is found postmortem but suprarenal de struction and a fifth comprising those cases which are associated with purpura of the viscera and skin. Virchow suggests that the initial sudden increase in blood pressure mix tear a vessel previously damaged by bacteria or toxins and thus produce the so called purpure spots he suggests too that any sudden disturbance of the medulla oblongata may be a primary cause Toster considers the purpure spots a sanother manifestation of an overwhelming infection.

Any combination of symptoms may form the clinical picture but asthenia is the most constant

and characteristic of all symptoms

Materna (1012) claims that the symptoms of suprarenal hamorrhage are caused by auto intoxication with adrenalin which during the profound disturbance is thrown into the blood stream in large amounts Hyperadrenalæmia was found postmortem in one of his cases by the use of certain tests. In one test a specimen of blood collected from that flowing spontaneously from the liver produced prompt mydriasis on the living and on the isolated eye of the frog In another the presence of adrenalin in large amounts was demonstrated by the action of 1/2 per cent ferric chloride solution on frozen liver sections and on blood serum in these the liver cells and the serum took on a green tint char acteristic of adrenalin These findings were checked with test solutions of 1 1000 adrenalin chloride and by chemical analysis. He suggests that when hæmorrhage occurs in a suprarenal gland rich in cholin this product the antagonist of adrenalm may also be thrown into the blood stream and neutralize in whole or in part the effects of the adrenalin Thrombi in the large

work but the operator of vast and varied expenence in dealing with pathological abdominal rid dles should be chosen Only the latter can best deal with any of the many complications that may be present with this proviso I am able to stand back of what I have said I purposely speak in this manner as I want to give you something to take home with you. In the old days when discuss ing the subject we fought like bulls in the arena but behind the scenes we were perceful lambs. I hope it will also be so today

I have used the words forbidding pentonitis

This will be discussed later In the pr sence of a circumscribed peritonitis removal of the appendix with the proper technique is the correct thing to do By the proper technique I mean that the incision should be made lateral to the point or line of greatest tenderness, which in dicates the position of the appendix. We should not hesitate to cut the internal oblique and trans versalis muscles in a direction opposite to the course of their fibers if this gives easier and better exposure To operate with the view of preventing a subsequent herma is to expose the patient to the greater and more serious risk of dissemination of infection. If the appendix lies close to the carrier directed upward and out sard an extraperitoneal approach is the safest route and is easily made when after the overlying muscles have been cut through the transversalis fascia which is often ædematous and infiltrated can readily be sepa rated from the peritoneum and the latter exposed At this point palpation will often detect fluid \nd by hypodermic aspiration the character of the fluid can be definitely determined. The peritoneum is opened in the line of the wound, the fluid often actual pus or puruloid material evacuated and the cacum and appendix exposed

If the appendix is not in sight I at once lift up the overlying abdominal walls with Deaver re tractors and thoroughly pack off the surrounding peritoneal cality with moist gauge pads. If pus is found it is mopped up during the dissection in freeing the appendix. With a piece of moist gauze the cæcum is grasped with the fin ers and thumb and gently litted into the wound which must be large enough to allow carrying the cæcum far enough out of the wound to expose the anterior longitudinal muscular band the ileocolic fold of peritoneum the terminal ileum and the ileocacal fold of peritoneum which is continuous with the meso appendix. The base of the appendix is then seen on the outer side of the ilcocæcal fold These peritoneal folds are to the operator what the light houses are to the mariner. In the course of the dis section small moist pieces of gauze are so placed as

to prevent contamination of the exposed peritoneal spaces These small pieces of gauze with the previously placed large pieces enable one to guard against contaminating the non infected surround ing peritoneum. The appendix bein delivered if is tied off and removed with the cautery knife a glass drainage tube is carried into the belvis and aspirated to determine whether there is pus in the pelvis If the smear of this aspirated fluid shows micro organisms the tube is left in if not it is removed. A cigarette drain or a rubber tube may later be substituted for the glass tube if drains e is necessary. When the case has been a very dirty one no attempt is made to close the wound

In the presence of pus I always examine the external paracolic groove Occasionally it will also be found to contain pus and if so I explore farther upward and often find a collection be tween the diaphragm and the liver as well a beneath the liver. These respective points are then thoroughly drained I have operated upon many such cases with excellent results. The latter type of case represents a combined circumscribed and limited diffused peritonitis. In my earlier exnemence under the conditions I have just men tioned I terminated the operation by simply exacuating the collection at the site of the appen dix removing the appendix and institutin drain age When practicing this technique I was fre quently obliged to operate later for one or more secondary collections so that I have adopted the

technique sust described If you were to ask me to what I attribute what ever success I have in the surgery of intra abdom inal pus collections I would answer first to the location of the collection or collections of pus and second to the proper disposition of gauze pads not gauze towels before I attack the collection This question i as once asked me by that great and master surbeon the late John B Murph) when I gave him this answer Murphy said Amen I grant you this requires skill and art both of which can be acquired by experience When as some of you have heard me I ask my gauze nurse why she is so confident in tellin me that so many pieces of gauze are missing she answer experience in this job gives me confidence

A circumscribed peritoritis is easily recognized by the presence of a limited swelling limited rigidity limited tenderness circumscribed pain and either the absence of peristal is or hypoperi stalsis as compared with the peristal is surround ing the peritonitic area to ether with resonance to light but duliness and flatness to deep percussion and limited mosement of the abdominal walls over the site of the lesion In making the dia nosis I attach the greatest importance to the physical signs. A leucocytic and polynuclear count should be made as a routine measure but in the majority of instances I attach little importance to either When I do consider the blood picture. I pay more attention to the polynuclear than to the leucocytic count.

In circumscribed appendiceal peritoritis with the abscess close to the ileocæcal junction beneath the terminal ileum and mesentery and with the terminal ileum thickened and stiffened having to a great degree if not entirely lost its contractile power after the pus is evacuated appendix removed and drainage established an ileocolostomy or sometimes an ileocæcostomy will make recovery more certain. I have done this many times with

most satisfactory results

This is particularly true in the large abscess cases in which this portion of the bowel forms part of the wall of the abscess cavity for then not only the patient's recovery is better assured but also his immediate postoperative comfort for there is less likely to be pain from the retention of gas Again secondary operation for obstruction that occurs occasionally in these cases three or four or more days after operation is avoided

Let us now consider diffusing peritonitis by which is meant a spreading inflammation not in volving an extensive area and differing from the circumscribed variety in that it is not limited. In the diffusing peritonitis there is both peritoneal inflammation and peritoneal irritation, the latter being the forerunner of the former regard this as a distinction without a difference but I hope to show you that it is not Diffusing peritonitis differs from the circumscribed variety in that while the patient looks and is sicker yet he has not the peritoneal facies The pain is more pronounced and is referred over a greater surface there is a much larger area of rigidity and tender ness peristaltic sounds are either absent or very feeble or peristalsis is aggravated around the in flamed area corresponding to the area of peritoneal irritation and abdominal breathing is more limited than in circumscribed peritonitis Diffus ing peritonitis is definitely recognizable by the careful observation of these physical signs Time and again have I demonstrated this to my classes and subsequently proved it at operation by the presence of inflammatory adhesions adherent coils of bowel and adherent omentum occupying the area mapped out as the site of the inflamma tion when examining the case before the perito nitis had subsided Cases of diffusing or spreading appendiceal peritonitis are not operated upon until the subsidence in part or in whole of the

peritoneal inflammation which in the experience of the Lankenau Clinic practically always takes place if strict anatomical and physiological rest

regulation as we call it is carried out I regret to say that outside of our clinic when I see this treatment it is not always given correctly. The familiar saying what is worth doing at all is worth doing well certainly applies here there fore even at the risk of trying the patience of those of you who are as familiar with it as I am I shall describe this treatment in detail

First allow me to say as you know this is bet ter known as the Fowler Murphy Ochsner treat ment (a galaxy of stars of master surgeons whose memory and great achievements have been left to us as a priceless heritage) In the Lankenau Clinic for breatytof expression we styleit regulation butnot in any sense in the attempt not to use the names of the originators for they are names to conjure with

Antionical and physiological rest means rest of the body and of the alimentary canal Rest of the body consists in confining the patient to bed in a sitting position which is maintained by means of a pillow placed beneath the tuberischi and a folded sheet carried beneath the portion of the pillow anterior to the tuberischi the ends of the sheet being carried to the head of the bed to which they are tied the patient is back, being supported by pillows and a pillow placed beneath the knees

To keep the patient in this position calls for much attention upon the part of the nurses The position can be made easy to a great extent by the mechanical beds used in many hospitals but they are not used in our clinic Rest of the body is further aided by giving small doses of morphia which serves a double purpose in that it also rests the small intestine by reducing peristalsis Rest of the alimentary canal physiological rest is ob tained by washing out the stomach giving nothing by mouth either in the way of water or nourish ment by giving enough morphia hypodermically to prevent active peristalsis applying ice to the abdomen to benumb the nerves of the walls of the abdomen this in turn affecting the abdominal sympathetic nerves with which the nerves of the abdominal walls communicate through the spinal ganglia and lastly giving the Murphy drip of normal saline solution to which is added glucose and whisky It is not uncommon to be told by nurses that the patient will not take the intra rectal solution but this happens only when it is not being properly given. This was stressed by Murphy when he first described the method stating that the height of the container of the solution above the level of the mattress must be

such that the intra abdominal pressure and the pressure of the solution entering the rectum are equally balanced. For example, if the pressure of the saline solution is too great as happens when the container is placed too high the solution will not be retained while if the reverse is the case no fluid enters the bowel. This calls for intelligence and knowledge on the part of the attendants. This treatment must be consistently carried out until the conflagration, the peritonitis is under control as evidenced by restoration of normal peristalsis which has been held in abevance to prevent dis semination of infection and which can be reconized by abdominal auscultation and the passing of flatus a sound so harmonious to the ear of the doctor and the nurse. This indicates that the crest of the wave has been reached and the storm will soon abate. It further means that the peritonitis will either entirely clear up or become car cumscribed when operation can be done with a greater degree of safety than when the storm is raging Richardson expressed the idea so well when he said too late for an early and too early

for a late operation The rationale of this treatment is north while detailing Washing out the stomach quiets the movements of the diaphra em the under surface of which is so rich in lymphatics and lymph spaces and this quiescence affords the patient immediate relief. The diaphragm, when in active motion performs the function of a suction pump in that infection is rapidly drawn into the lymph spaces and the lymphatics through which it is carried in to the blood stream causing blood stream infec tion This is sufficient reason not to give medi cines or anything by mouth that might excite nausea or vomiting. In the pres nce of the latter layage should be repeated. It is a well known physiological fact that water gi en by mouth is absorbed by the terminal ileum and the first por tion of the ascending colon and to reach the latter it must be carried by peristalsis of the small bowel which in turn means danger of spreading the infection This means we drink with our ter minal ileum and the first portion of the colon On the other hand if the intestines are parietic the plexuses of Meissner and Auerbach under the con trol of toxins fluid given by mouth will cause vaterlogging overdistention and reverse pens talsis regurkitation of duodenal and stomach contents and comiting a further indication for lavage or the passage and retention of a duodenal hucket in the stomach to maintain continuous

The second physiological fact is that absorption of nourishment takes place in the small

intestine therefore we eat with our small intestines. Sir Berkeley Moynihan's lines

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ndbd Tood and dnk rryhm daper is
tmhm mad

exemplifies the rationale of arrestin peristals by not giving anything by mouth I am sure many or some of us at any rate recall reading that wonder ful little book long since out of print by the distinguished Englishman Hilton on rest and pain which supports the rationale of putting the intestines at rest and abolishing pain by givin morphia However I do not think it necessary to go so far as did Alonzo Clark or does our distin guished colleague and friend Crile who gives enough morphia to reduce the respirations materi As I see it the therapeutic indication is carried out when we abolish p ristalsis and pain and maintain rest of the body. The fact that nature does this in the late stage of p ritoritis toxemic abevance of peristalsis su rests the ra tionale of physiological rest

This I believe is sufficient to impress upon you why I advocate the treatment of anatomical and physiological rest or regulation as we prefer to call it It is not at all uncommon when I am called at night by phone to be told that a case of appendiceal peritonitis sick for 3 of 4 days has been admitted to my hospital service for Mrs Deaver to say Tell them to put him on re ula This may sumest how familiar this treat ment is in some home circles I do not hesitate to say that any form of treatment other than this is unanatomical unphysiolo-ical and entirely out of tune with nature's forces therefore not only irrational but illogical I am prepared to say that this treatment cannot be thoroughly carried out in the home but only at the ho pital and often here

the home but only at the no pital and often the tis not successful for want of absolute faith be gotten by large experience with it and the want of howledge how to use it. Faith here as in reigion we must have to award our pentonius patients and to award ourselves. Before leaving this subject I might say, that in addition to this treatment. In podermoclysis and intravenous annewnth glucose are used in the very dehydrated cases. I have not had much success with continuous intrasaline as practiced by Matsa partly due no doubt to the extreme condition of the patient when the treatment was instituted. Does this not often happen with extreme measures used when too late to expect good results?

Finally, let us discuss diffused appendiceal per

Finally let us discuss diffused appendiced per tontus. Diffused appendiceal pentonius in its early stage presents a picture familiar to us all with its general rigidity of the anterior abdominal wall tenderness corresponding to the area of rigidity practical absence of abdominal breathing the peritoneal facies rapid pulse tense and often bounding comparatively high temperature and evaggerated peristalsis. The blood picture shows eighteen to twenty thousand leucocytes and eighty five to ninety five polynuclears the latter varying with the type of the infection Twenty to forty hours after onset of the peritoneal inflamma tion or earlier if the patient has been purged the picture changes to one of general abdominal distention the rigidity being much less pronounced tenderness not nearly so decided entire absence of peristalsis later followed by tinkling and finally a silent belly an ominous sign when only the pulsa tion of the abdominal aorta is heard louder than normal and a rapid pulse with diminished volume more pronounced peritoneal facies a blood picture of moderate or low leucocytosis but high polynu clear count diminished output of urine that shows albumin hyaline and granular casts relaxed skin that later is sweaty and cyanotic vomiting or regurgitation of dark vomitus often foul smelling and restlessness and an active brain This pre sents what is considered a hopeless proposition but not necessarily so if the treatment already de scribed is carried out early and to the letter I have seen recovery with local abscess formation, the simple evacuation of which was followed by convalescence When much of the active perito neal inflammation has subsided but has left mul tiple foci of pus the patient dies of toxemia When the peritoneal inflammation has only par tially subsided and has left a large collection involving the pelvis and the lower abdomen the patient may sometimes by drainage alone get well These are cases in which puncture through the rectum or the vaginal vault have occasionally proved successful

I have however seen instances of the latter type in which death occurred a few hours after a simple puncture. In this class of cases shortly following the puncture there is a sudden marked rise of temperature always a precursor of death

THE CLINICAL SIGNIFICANCE OF CHOKED DISCS PRODUCED BY ABSCESS OF THE BRAIN¹

BY WALTER I LILLIF M D ROCHESTER MINNESOTA F m tb S t Ophila Im I gy M y Cl

THE ocular syndromes produced by brain abscess and brain tumors are similar but in the former the ophthalmoscopic evidence

that the associated choking of discs has reached a definite stationary height or is still developing is of great importance from a neurosurgical stand

point

The formation of a brain abscess was well described by Macewen in 1893 and since that time little has been added to his classic work. He divides the clinical sequence of events produced by the formation of a brain abscess into the initiatory stage characterized by severe head pains vomiting rigor and fever the second stage characterized by deadening of the head pain which can be elicited only on percussion slow cerebration want of sustained attention apy revia slow pulse paralysis and optic neuritis and the terminal stage in which there is either leakage of the pus into the membranes or ven tricles accompanied by fever convulsions and coma or complete encapsulation of the abscess which may remain quiescent for a long period and finally may become absorbed in some cases without surgical interference

In Macewen's cases optic neuritis was fre quently seen especially in the later stages and was usually mild although in some cases the swelling of the optic discs advanced rapidly and even increased after the abscess had been evacuated. The term optic neuritis which was used up to 1893 and even later in describing the dedema of the optic discs produced by brain abscess or tumor has been replaced by the term

choked discs masmuch as the cedema is due to increased intracranial pressure and is not the result of inflammation. In cases of choked discs there is no loss in visual acuity or changes in the perimetric fields characteristic of optic neuritis.

The cases observed in the Mayo Clinic in which brain abscess has been associated with choked dises were in the second and third stages (Mace wen) In the other cases of brain abscess there has been a fulminating course with early death without the appearance of choked discs. Clinic ally the ocular syndromes produced by encapsu

lated brain abscess are the same as those produced by tumor of the brain. In 11 cases of definitely encapsulated abscess of the frontal lobe the bilateral choked discs in 8 ranged from 1 to 6 diopters. The visual acuity was good in all eases and the perimetric fields revealed only mild concentric contraction for form and color Only one abscess of the frontal lobe which produced a typical basal frontal syndrome could be located ophthalmologically This does not agree with Eagleton's experience in cases of abscess of the frontal lobe. In cases of temporal and temporo sphenoidal abscess there was the typical ophthal molo_ical syndrome produced by tumor in that region normal visual acusty bilateral choked di as and homonymous hemianopic defects of the visual field. This same syndrome was revealed in easis of abscess of the oc inital lobe The choked discs also varied from 1 to 6 dior ters in these groups. In cases of abscess 1 the eere bellar lobe a choked disc of more than 2 diopters was not observed which is quite the opposite to observations made in cases of eerabellar tumor In all of the groups the pupillary disturbances oculomotor paralyses and nest agmus were of no clinical importance in determining the site of the abscess

Repeated onhthalmoscopie observations of the choked discs is of great importance in cases in which the diagnosis of brain abscess is definitely established as the onhthalmologist can be of aid in determining more or less needrately the time at which the abscess is completely encapsulated In the Mayo Clime it has been noted that the best results are obtained by operation in those eases in which the neurological and ophthal mological syndromes could not be distinguished from those produced by a brain tumor similarly situated In such cases the history and the pathological changes in adjacent structures established the diagnosis of abscess. In every case there was choking of the discs which had reached its maximal height and vas stationary The encapsulated abscess then acted purely as a foreign body or tumor to which the cerebril tissues had become adjusted. When operation was performed during the period when choking of the discs was increasing the postoperative course was storms and the motality rate rather high. As a rule the choking of the discs reaches the mercinal height in a relatively short time so that surgical interference is not delayed and the ultimate prognosis is much better. Choked discs are, not present in all cases of encepsulated abovers just as they are not found in all cases of brain tumor and their absence should not be mislewing. The presence of choked discs especially in association with mastoditis and questionable intradural involvement does not prove the evistence of brain abscess and hast intraen and operation is to be discouraged in those cases

CONCLUSIONS

The ocular syndromes produced by an en capsulated brain abscess are the same as thos produced by a brain tumor similarly situated

Choked discs in eases of eerebellar abouts have less clevation than those produced by cere bellar tumors

3 The presence of choked discs in eases of intradural supportation does not always signify the presence of brain abseess

4 I apidly developing choked dises in eases of brain thiseess are significant of a changin cerebral process intracranial operations dum this period give unsatisfactory results

5 Stationary choked di cs in cases of brain absess observed over a short period of time indicate enerpsulation. Intracranial operations during this period give excellent results.

6 Rep ated ophthalmoscopic evamination of choked discs in cases of brain abseess is of great prognostic value

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THE HORSLEY PYLOROPLASTY IN ACUTE PERFORATED DLODENAL ULCERS¹

By I WILLIAM HINTON M.D. FACS New YORK As t tP fesso [S rg ry t w k k P tG d t Med 1School dH pt l Adj tVast gS geo B llevu H pt l

FTER Horsley (2) published the technique of his pyloroplasty in 1919 considerable in terest was revived in this type of operation Erdmann and Carter (1) published a series of 56 cases in 19 5 in which the Horslev technique was followed The results shown in this series were very satisfactory and in reviewing 56 histories and follow ups the authors reported a symptomatic ulcer cure in 94 per cent Of their series they were able to trace 84 per cent of all cases Wix experi ence with the Horsley pyloroplasty in chronic ul cers has been limited to 3 cases. One had a recur rence within to weeks following operation one died from a pulmonary embolus while in the hos pital and the third case has had a gastric disturb ance but not a typical recurrence and the roent genological examination of the gastro-intestinal tract was negative

In acute perforated duodenal ulcers it appeared that this type of operation would be ideal as the ulcer could be excised and the stomach left practically in its normal anatomical and physiological state For that reason between 1923 and 19 6 in clusive the Horsley pyloroplasty has been done in 12 cases of acute perforated duodenal ulcers The result of this series seems to be of some interest Two cases were operated on in 1923 four cases in 1924 three cases in 1925 and three in 1926 All were males the youngest being 2, and the oldest 48 the average age being 35 years The shortest time between the perforation and operation was 4 hours and the longest time was 15 hours

Location of lesson In each case the ulcer was found on the anterior superior surface of the first portion of the duodenum. The perforation varied from to 8 millimeters. The duodenum was easily mobilized and excision was possible without diffi

Technique of operation The technique as de scribed by Horsley was followed and the incision was usually 1 inch on the duodenum and from 1 5 to 2 inches on the stomach. The mucosa was always sutured with \o i chromic gut aware that Horsley later gave up suturing the mucosa as he felt that it was a factor in causing recurrences Then a Cushing right angled suture of \o I chromic was used followed by a Lembert running suture of \o i chromic The abdomen in all cases was closed without drainage. The excised

tissue was submitted for histological study and each ulcer was shown to have been completely excised

Follow up One case died from pneumonia on the third day after operation this case being the one which perforated only 4 hours previous to op eration Two cases have not been followed al though they were personally instructed about the importance of returning to the Follow Up Clinic The fourth case has been symptom free for 31/2 years and the fifth case has been symptom free for 3 years but returned 14 months ago with acute appendicitis This patient was operated upon by me and the duodenum was inspected at the time of the appendectomy and was found normal. The pylorus admitted the tip of the index finger and there were no adhesions about it. A sixth case operated upon 4 years ago had a definite recur rence both clinically and roentgenologically 3 months following the operation The seventh case operated upon 23 months ago was perfectly well for 15 months when he began having fullness in his stomach which was followed by a nausea and vomiting Roentgenological examination re vealed two thirds of the barium meal retained after 6 hours He was operated upon 7 months ago and the pylorus was found obstructed but no masses could be detected. A posterior gastroenterostomy was done. Since the second operation the patient has been free from symptoms

This leaves five cases which have been bothered with abdominal discomfort after eating the discomfort being similar to ulcer pain but lasting only a few days at a time Of these cases one was operated upon 16 months ago another 28 months the third 33 months the fourth 42 months and the fifth 45 months The pain in all these cases had some degree of periodicity returning at inter vals of 2 to 5 months A roentgenological exami nation of the gastro-intestinal tract in all five pa tients was negative. Each patient has had two or more examinations. The patients were given di etary instructions to follow on leaving the hos pital None of these cases had any evidence of cholecystitis or cholelithiasis at the time of the operation Gastric analysis showed a variation in their total acidity of from 40 to 70 per cent the average being 53 per cent Erdmann states that in perforations it has been his custom for years to do an excision. This he did before Horsley's a strictle was published practically as Horsley's operation for non perforated ulcers was described but added to his plastic a gastrojejunostomy. However having had occasion to reoperate upon one of this patients and having found a much wider duode munt than normal at the site of excision and plystic operation he decided to refrain from donn the added gastrojejunostomy. He fails however to state how many perforated ulcers he has operated uponsince giving up the ruddid gastro enterostomy.

SUMMARY AND CONCLUSIONS

- r In this series of 12 cases there was one death and two cases cannot be traced
- 2 Two patients are entirely well to date one for a period of 3 years and the other for 3 / years 3 One patient had a definite recurrence and another a pylone steposis which necessitated a

gastro enterostomy

- 4 live cases were not symptom free and could not be classed as having satisfactory urgical results
- 5 This leaves 9 cases which have been followed or a total of 22 per cent that are entirely well following this type of operation
- 6 In view of the above results one does not eem justified in continuing to use this type of operation
- I am nd btedt Dr Carl G Bu d k Dre to fthe Furth Srg al D o of Bell e H p tal fr th p I ge f epo ti these c

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RESTORATION OF THE CEMAIC URETHRA AND VESICAL SPHINCTER

AN OPERATIVE TECHNIQUE RESULTING IN URINARY CONTROL¹

B W H McC W M D AND MARION DOUCLASS M D C EVELAND OIDO F m the Dep m for 1 th Res U y Shool f M d d h Lakes d H p 1

OMPLETE loss of the urethra is a comparatively rare condition and its replacement with the creation of a functionating, escal sphincter is a matter of consid ribbe difficulty. The employ ment of patience and circ max how ever overcome the most serious obstacles. We wish to report a technique leading to a highly satisfactory, functional result.

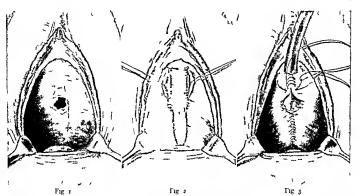
Ward well states that no two cases are exactly althe and the technique must be improvised to cope with the particular conditions of the individual case. Many methods have been suggested and tried but very few results have actually been effective.

Baker Brown (1863) perforated theanterior vag nal wall obliquely with a trocar below the clutons and made a puncture wound into the hladder Through this opening he introduced a silver cath eter and eventually after the wound healed oh tained a urethra which gave complete continence of urine provided the bladder was emptied fre quently

Kelly elaborated this idea of the tunnel in the mucosa in the anterior vaginal wall. He dissected an elongated tongue of mucosa from behind the fistula and pulling it forward over the fistulous opening and into the tunnel made a new uniary canal the anterior half of which was epithelial ized. Noble Sellheim P an and others successfully reconstructed the urethra transplanting flaps from various parts of the labia vaginal wide tect but the restoration of urinary continence following these procedures has not been frequent Richards and Rosser employ of free transplants of falloprin tube and of the vermiform appendix and secured functionating urethras.

The construction of an artificial sphiniter is a difficult problem. Deming transplanted a sinp of gracilis muscle and brought the urethra through a loop made like a riquet in the end of the transplanted muscle which supplied the urmary ca af with a support which had sufficient tonus to allow the bladder to excrete normally

Rucbsam and Bryosonsky employed the pyra midalis and ley ator am muscles and obtained satisfactory functional results. The suture of a tom sphincter is not a difficult procedure and is fre quently reported but the difficulty hes in cases in which through trauma or slough it has been entirely destroyed



I ig t The fistulous opening in the anterior varinal wall. Outline of the denudation

Fig 2 Mobilized strip of mucosa turned anteriorly and sutured to anter or flap covering fistula and pr ducing a completely epithelialized tube

In the case here reported we attempted to construct a mucosa lined urethra and then at the second stage to improvise a sphincter by employing transplanted strips of levator ani muscle as pedicle grafts encircling the urethra at the neck of the bladder. In view of the difficulty of obtaining a successful functional result in many cases of in continence it seems worth while to give the history of the case and operative technique in detail.

Mrs R colored a_ed_go_years v para Pattent came note The Jakesde Ho pital complaine of f equency of unnation since her last pregnancy 5 yea 5 ago with almost complete; continence during, the last several month. If r last lat or was somewhat difficult and she had had net mittentine attience-durin since that time all high I tall loss of control had d veloped only within the last yea. There had been also a gradual increase; I the am unt and duration of the menstrual periods. The b 1 y had been large but the e had been no instrumental deb. Ty or op r attive-proceduc attempted The Wassermann as negative

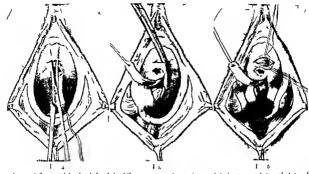
One amination we found the outlet I be ela ed There was a moderate cyst cele and retoced. The ur thra had been torn away and the s tuation of the present urethral office was almost e acity at the ne k of th bladder. The speni admitted a bitle finer which c ld le passed through the neck of the bladder. There was a pobypo deciropion of vesical mucos in the firm of a papill of with which acted almost as a ball valve. The cele was considered that the control of the contr

Fig. 3 Suture of the vaginal flap over the new urethral canal with a retention catheter in the urethra and closure of the defects beside the fistula (the weak point). The mu cosa was lied 1 throughout the whole length of the in casa in

It was decided merely to attempt the reconstruction of the urethra and bladder sph ncter and perform hysterectomy and per neorrhaphy later There wa considerable scar tissue in the ag nal vault which made the denudation some hat diff cult

Operation The redundant vesical mucosa was carefully excised and the vesical neck narrowed by fine entgut sutures placed deeply enough to in volve the muscle of the bladder neck in the area where the mucosal attachment was excised. An incision was then made in the vaginal mucosa at a point approximately a centimeter from the mid line extending from the fistula to the proposed external ornice of the urethra A similar incision was made on the other side. This flap was under mined for about one third of its width bilaterally leaving a rather wide point of attachment through its entire length in order to insure its blood sup ply (Fig. 1) A spade shaped incision was made posterior to the fistulous opening and the flap was turned through 180 degrees to cover the fistula and to form the anterior wall of the new urethra The transplanted flap of mucous membrane was joined to the strip left on the vaginal wall with a running stitch of fine chromic catgut this forming a completely epithelialized tube and replacing the urethral orafice at its proper position (Fig. 2)

A small mushroom catheter was placed in the bladder. The lateral flaps of the anterior vaginal



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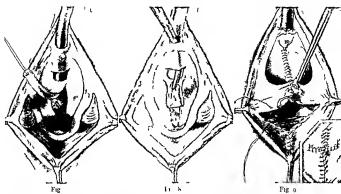
wall were well mobilized I v un lercutting further and were finally by ught tog ther over the new urethra with a much of the ve ical fassa as it was possible to approximate in the midling (Fig. 3)

it pl Th c thet dth 1 t · t thptp d bout y f thr l f W dd t l kg f mth mplttk fth t1 o i wklt thpt Im tt d t th'h pfl Il th t mg fa adg mpl fm kdp th tht dd 1 b m d th 1 dd with p th p fott Im the feq t though the dedh fp t m t t 313 tm tth f lb m Th bl du d ph 1 lph phth ! mllmt 1ft th t mp w th m lf tt mpt w gmdt d t f th y app al h d t lwh stt gad lm t m mpl t 11 dd pl t h f t f th bl dd t l h thy If the bldd bem t lidt ddth f eq y glks. The p blm th d h h d f th

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Operation The operation for extension of the until his with construction of the vessel sphnotter was curred out as follows. A flap of mucosa one half inch wide was dissected free from the antenor against wall up to the infenor openin of the urethrax here a rather broad attachment was left (Fig. 4). Uran verse incression one half inch lon was made through the vaginal mucosa just after to the upper margin of the present urethral onfice and a similar incission was made below the choicins in the middine by men of secsor disection and the mucosa was elevated formin a small tunnel for the new urethra (I). 4)

The employment of strips of transplanted leva tor an mu cles and fisca is reinforcement for the sphincter was attempted next. A Hegar denudation of the posterior viginal floor was made and the strips approximately i centimeter in diameter were cut from the medial edees of levator an inside the pendeles of the strips were stuated almost at the level of the bladder sphincter in the Internal viginity was 10 million to get on the medial edees of the bladder sphincter in the Internal viginity was 10 million to get on turnel.



lig 7 In ertion of retention catheter throu hith ne

sphincter
Fig 8 The mobilized flap of mucosa i pull if r
ward through the canal in the submucosa c v in the
opening of the present urethra and formin an p thelial

were made under the lateral vaginal mucosa on either side of the urethra to accommodate the muscle transplants. The two strips of muscle were pulled up to the bladder neck (Fig 5) and were crossed and sutured anterior to the urethra and the ends approximated posterior thus forming a complete ring of muscle (Fig. 6) A small mush room catheter was inserted at this point through the tunnel in the anterior vaginal mucosa and be tween the two strips of levator ani muscle (Fig. 7) The flap of vaginal mucosa which had been dis sected free from the cervix (Fig. 4) was brought through the tunnel along the unterior surface of the catheter to form the anterior outer surface of the new urethra (Fig. 8) Two interrupted chromic No oo sutures were taken in the angle of the pedicle near the neck of the bladder on each side to repur the two small lateral defects where the mucosal flap was bent sharply upon itself as it entered the tunnel The denuded portion was closed with a continuous chromic catgut suture the super ficial fascia being closed first with mattress su tures (Fig 9) Near the sphincter of the bladder the vaginal mucosa was dissected rather far back to allow its better mobilization. This was everted somewhat by deeply placed sutures thus creating a bulkhead over the neck of the bladder to rem force the small lateral defects at the edges of the

exin for the anterior wall of the new ureth Fig 9. Suture of th submue sal fase a and valu mucosa 1 c mplete and the closure of the mucosa of p sterio xa mail wall is being completed in a T shape ax d itensi n

new urethr. The permeorrhaphy was complete and the raw edges of the levator am muscles a proximated with interrupted chromic catgut's tures. The superficial fascia and the mucosa we closed with continuous sutures.

The transplanted levator an muscles could no be felt lung in the upper lateral walls of it vagin. The vagina barely admitted two finger and was the source of some inviert to its because from the source of some invierts. The point greatest nurrowing was at the neck of the bladd about 15 inches from the outlet. The urmastream now wis divirted into a canal the posterior wall of which consisted of the united levator muscle transplants and suture line (Fig. 5). We failt to examine the subsequent degree of epithelialization of the new formed sphincter by urethroscopy seemed univis Immediate convilescence was uncomplicate.

The extheter was removed on the twelfth post operative day and the patient was completely in continent. She had a chill the following day with headache malaise and leucocytosis. The urn showed a few puscells. The temperature returne to normal in 3 or 4 days. Careful investigation of the urne pelvis and lungs failed to reveal the source of the chill. The extheter was re inserte without discomfort and there was no leakage.

The catheter was removed in FU ruin. 6 ag days lister and the patient had fair voluntry control of urnation. Occiss hall, the urne escaped without her knowledge but by emptying the blad der furth, frequently she was able to minitin a fair degree of continence at the time of hir discharree from the hospital.

charge from the nospital.

We have made periodical evanunation of the patient since the operative procedure. The has texamination no months after the operation revealed the urethra measuring, approximately a inch in length from the vesical neck to the orifice. At least one half inch of urethra wiso lot by sleugh following the second peration. The sagnal critical action are to the processing freely and the pritient says that she is perfectly comfortable and has practically as good control of urnation as at any time in her life.

It is probable that in the light of the outcome of this case we will employ nly the procedure shown in I igures 4 5 6, and 8 in future cases in which restoration of the urethra in I sphincter

is indicated

At examination approximately a year after operation we found the putient fully continent regardless of the amount of the fluid intake except for the very occasional I so of a few drops. She has no nocturn and the use of y pa I so never necessary. It is noteworthy that timit pressure verted on the midpoint of the yagnal after a the butlet pulls on the leval or muscle tran plants and uring flows from the urethral onnice. Inch primptly stops when the pressure is removed and the ure thral orif ce again becomes shit like is the phinc teric action again across into 1 la.

The omission of the perineorrhaphy mi ht have been an advintage as a scrutiny of the mechanics of revimped levator muscle attachments shows. As has been stated above any pull on the perineal floor also pulls down on the urethral floor which favors levakage.

It appears from the examination of uninafunction in this cale that this result is not merely dependant on mirrowing the urethra at some point by the interpolation of an artificial bulkhead the patient is able to void as well as to stop unnation at will and to produce visible voluntary contraction of the soluncter.

We believe that we are justified in recommend ing further trials with levator muscle transplants in the repair of vesical sphincter defects in the female.

REFFRENCES

A CONSIDERATION OF BLADDER TUMORS WITH SPECIAL REGARD TO THE THERAPEUTIC MEASURES BEST SUITED TO THE DIFFERENT TYPES¹

BY WILLIAM & FRONTZ MD BALTIMORE MARYLAND
F m h J m B b B dyl lg 11 ttt J b H pk H pt 1

EFORE the introduction of fulguration and radium therapy the only means at our command for the treatment of bladder tumor was surgery. The necessity of differentiating one type of bladder tumor from another

was a matter of trivial importance

The first effort of the surgeon for the cure or destruction of the bladder tumor entailed supra pubic exposure and cauterization by means of the hot iron or by the more modern forms of cautery If the tumor was pedunculated or even sessile but non infiltrating the immediate results were entirely satisfactory in that the growth could be completely eradicated As these cases were followed subsequently however it was soon found that bladder tumor had an extraordinary tend ency to recur In many instances in which the operator had succeeded in removing a simple single growth multiple tumors were found some months later A second operation with destruc tion of the recurrent tumors would again he fol lowed by recurrence While cures were occa sionally obtained and freedom from recurrence was ultimately secured this happy result was exceptional most of the patients eventually dying of extensive carcinoma of the hladder The results were so discouraging that many urological surgeons advised operating only in cases of necessity for the relief of some complication The failure of the surgical procedure in this type of tumor is due not so much to the procedure itself but to the lack of means of treating recur rence Tumors of this type can be thoroughly and effectively destroyed by cauterization but the growth of new tumors cannot be prevented

Formerly when the tumors were infiltrating especially deeply infiltrating very few if any satisfactory results could be secured by any methods of cauternzation then available. The rapid realization of the ineffectiveness of these methods for the cure of infiltrating tumor led the bolder surgeons to attempt resection. The results obtained by the radical resection of the tumor area with a margin of healthy blidder wall gave surprisingly excellent results and many surgeons were led to adopt this method absolutely in tumors of the non infiltrating type. The results however in this latter group were not as

satisfactory so far as ultimate cure was concerned because of the greater tendency to recurrence. The suprapulate exposure of these non-infiltrating types of tumors resulted not infrequently in tumor implantations at points in the bladder previously uninvolved as well as in the suprapulate tract.

With the introduction of fulguration by Beer in 1910 there began a new era in the treatment of the more benign papillomatous tumors. More recently the introduction of radium has proved of great value in the more malignant forms of

tumo

The object of this paper is to show the necessity of careful differentiation of the various types of tumor and to point out forms of treatment which experience has shown will give the hest results For example in one group fulguration will be successful in another group resection is the method of choice in another radium applied to the surface of the tumor will suffice in another in which fulguration resection or surface application of radium is not applicable implantation of radium in the form of needles or as the emanation will yield results in cases hopeless to any other form of therapy

It has usually been our custom in the classification of bladder tumors to differentiate one tumor from another histologically. Thus papillomata were divided into the benign and malignant types. In the former group were included those tumors in which the epithelium lining the connective tissue axis had a palisade arrangement at the base above which were several layers of oval long tailed cells all of which were of uniform size and shape and took the stain with uniform in the insity. The papilloma was considered malignant when this uniformity in the size shape and stanning characteristics was lacking or when the connective tissue axes of the tumor were infilited.

When infiltration of the pedicle of the tumor or the hladder wall was present the tumor was no longer regarded as a papilloma but was termed a papillary carcinoma. It should be noted however that in many of these malignant types of tumor particularly the malignant papilloma many portions of the tumor often the major part

presented a perfectly benign appearance hist lo ically. On the other hand it was occusionally observed that in an apparently benign tumor a ctreful and painstaking search would finally estable h a malignant character. In many of these cases therefore where a simple block of tumor tissue was removed for section a diagnosis of the benun type was made, whereas, if other specimens of the tumor had been examined definite histological proof of milienancs would have been forthcoming

The classification to be ad a tell in this parer is not one lased upon the lustolo, of tumors as this has proved in our experience t be of very little practical value. The inference histol airally between the benign an I malignant papilloma is of no practical value B th types of tumor will usually respond equally well to the same type of The only practical a hantage of this differentiation is that ne can product somewhat more accurately that there will be a greater ten! ency to recurrence in the case of the malienant papilloma \s ction of the flit non infiltrating papillary carein ma may not differ at all from the histological picture presented by the tissue obtained fr m the surface of the papillars tumor the base of which is deeply intiltrating. If one were to depend upon the histological picture alone the form of therapy succe sful in the ne case should be equally successful in the other Our practical experience however has shown distinctly that this is not true I adium applied to the surface of the non intiltrating papillars carcinoma vill usually effect its removal but when applied to the deeply untiltrating tumor it has been found to be entirely usele a and even harmful

In a long stries if cases nucles of tumor were removed in all cases in which this was possible and the hi tological pi ture was compared with the cystoscopic appearance of the tumor. It was observed that the data obtained from careful evstoscopy symptoms and pulpation furnished very much more reliable information as an aid to the selection of the form of therapy which would yield the best re ults

The pathologist can tell us with more or less accuracy whether or not the tumor is of the benign or malignant type. He cannot however tell us the depree of malignancy nor the extent and degree of involvement. This information is more accurately furnished by the cystoscope. The pathologist rarely furni hes any information of value to aid the urologist in the selection of the therapeutic procedure best adapted to any given case

It is proposed that from the standpoint of therapy bladder tumors be divided into tin ceneral croups the differentiation being has d upon the presence or absence of infiltration of the tumor pedicle or bladder wall. While errors in interpretation are bound to occur our stati tic show that untreated tumors which are clean and vascular and not associated with cystiti or exidences of adema about their bases should be regarded r roussionally at least as non infiltration and treated by endovesical therapy tumors which will include papillomata and the clean vascular sessile type of papillary carcinoma are usually not yery difficult to recognize The same may be said of the more extensive infiltrat ing tumors. The greatest difficults in a correct exstoscopic interpretation will be presented by tumors in which the infiltration is confined to the pelicle or extends only superficially into the bladder wall or in which because of the size of the tumor inspection of the mucosa contiguous to the pedicle is impossible. However in this particular group of tumors in which there is uncertainty as to the degree of involvement it has been our custom to re, and them as he on in to the non-infiltrating type and treat them accordingly. If they respond to this treatment well an I good of they do not little has been lost for it is generally believed that there is shi ht risk of early metastasis in superficially int ta a tumors

I ractically all of the non infiltratin types of tumor will respond to the so called endovesical methods of treatment which consist of ful ura tion the at plication of radium to the surf ce of the tumor and to a combination of the e two procedures Most of the papillomatous tumor will respond to fulguration alone. There are certun tumors of this group however which are resistant to this method of treatm at and it is our custom in all papillomata except the villous type to give from 300 to 600 mills ram hours of surface radium preliminary to fulguration a experience has shown that the tumor 1 thereb rendered more vulnerable to the procedure

In one of our early case an which a hi tolo ical study had resulted in a diagnosis of maligrant papelloma the value of preliminary radiation was most convincing and led to the very frequent employment of this therapeutic measure combrned with fulguration in the papillomatous type of tumor This patient was first treated by ful guration at monthly intervals for a period of about 6 months At each treatment the tumor which was 1/2 centimeters in diameter was vigorously tulgurated and apparently completely

destroyed At the next cystoscopy however the tumor gave no evidence of ever having been treated being of the same size and appearance as noted originally. After 6 months of fulgura tion a hourly treatments of roo milliprams of radium applied to the surface of the tumor were followed by vigorous fulguration which resulted in its eradication. The patient died of pneumonia a months later and a careful autopsy give no evidence of recurrence or metastasis

If on the initial cystoscopy surface neero is is noted in a previously untreated tumor or it a tumor has been subjected to fulguration and the slough fulls to separate promptly the tumor should be regarded as infiltrating and not suitable for endovesical therapy. The proper method of attack will often differ with the personal prefer ence of the operator but most authorities are agreed and our statistics support the conclusion that resection with a wide margin of healthy bladder wall will give the best results

Thus in 68 cases of cancer of the bladder in which resection was carried out there were 6 postoperative deaths Twenty of the patients or 32 per cent were well for I year or more while 13 or o per cent remained well for 3 or more years. It is interesting that in this series of 68 cases the ureter was transplanted 15 times In this latter group there were 6 or 40 per cent cures 4 of the patients being alive and well 9 years after operation and 2 dying from other causes several vears after resection

Multiplicity of the tumor or involvement of the trigone or vesical orifice may render resection impo sible and a choice between radium implan

tation or diathermy must be made

While our experience in the use of diathermy in the treatment of infiltrating tumors of the blad der is so limited that it is unfair to draw any definite conclusions regarding its relative value our personal preference inclines us to employ radium implantation in these cases. The tech mque we have followed consists first in free mobilization of the bladder followed by a surface destruction of the tumor by means of cautery thus diminishing the likelihood of tumor implants Platinum points each containing 1 milligram of radium element are then plunged into the base of the tumor I milligram being used for each square centimeter of tumor surface In cases of extensive malignancy particularly if the vesical orifice be involved the small points are reinforced by spears each containing 10 or 1 1 milligrams of radium element. The radium is allowed to remain in situ for from 4 to 48 hours depending upon the degree of bladder wall involvement. In this

was a radiation totaling 1 00 to 400 milligram hours can be obtained In 34 cases of bladder cancer in which this technique was employed 6 patients (17 per cent) were well for 1 year or more

The employment of cauters in the treatment of bladder tumors should be limited to the surface destruction of the tumor preliminary to resection or implantation of radium. That this therapy will succeed in destroying superficial neoplasms is undoubted but this type of tumor is best and most safely handled by endovesical means

In recent years many claims have been ad vanced favoring deep \range ray therapy In our experience this agent has been of greatest value in ameliorating the pains of nerve involvement In 10 cases of extensive and deeply infiltrating tumor this method alone was employed and in none of these cases was any marked improvement noted In .7 other cases receiving radium and deep \ ray in combination an apparent cure was obtained It seems apparent therefore that this form of therapy is most effective if the tumor is first subjected to a series of radium treatments

CONCLUSIONS

Much of the confusion in the past regarding the most appropriate treatment to be applied to any given ca e of bladder tumor is the result of the present classification which is based upon the histological findings in fragments removed by cystoscopic means. We have repeatedly demon strated the great possibility of error in basing a diagnosis upon the histological study of a single specimen thus obtained

In so far as the so called papillomata are con cerned the differentiation Letween benign and nialignant forms is of no practical import from the standpoint of therapy as both respond to a combination of radium and fulguration

In case of the so called papillary carcinoma greater confusion is present as the non infiltrating tumor of this type may present a histological picture identical with the tissue obtained from the surface of a tumor the base of which has extensively infiltrated the bladder wall An early differentiation of these two types of tumor is most essential as the former usually responds to surface

application of radium and the latter requires an

extensive surgical procedure

It is believed that much of the confusion created by the histological classification will be obviated by replacing it with one based upon the cysto scopic findings alone Under this classification tumors would be designated as either non infil trating or infiltrating. The experienced cystocopist will usually have little difficulty in making

this differentiation. In border line cases how ever the tumor should be regarded tentatively as non inhibitating and treated accordingly

Experience has shown that practically all of the non-inhitrating tumors vill respond to endoxesi cal (existoscopic) measures consisting of redum and full furtion alone or in combination. In the infiltration type these methods are contribudicated.

All of the infiltrating tumors a situated as to

transplantation of the ureter vill be necessary. However in other tumors which are too even sive or which in olve the vesical orific and the prostate the implantation of radium is recommended.

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ACUIT INTESTINAL OBSTRUCTION DUL TO IMPACTED CALL STONES

PLIORT OF FOUR CASES

IN JOHN II POWERS MD Bosto

A LAI GE impreted gall stone i too seldom considered as in eti logical factor in acute intestinal ob truction B₁ n) means rire the condition occurs with sufficient frequency to mert attention. The first recycle! Ts. is that of Bartholin (i) in 1654. The monumental work of Courtouser (4) contrium an admirable analysis of all the reported ca es prior to 1850. Wagner (12) made an exhaustive study of the literature in our and collected and typhilite is 24 case.

The 4 cases herewith reported x curred in 179 patients operated on f runesimal b truction at the Peter Bent Brachim Hospital during the past 14 tears. The frequency is obstruction by agalistone in this series is in 45 or pet cent. This figure agree with that if Moore (8) vio estimated from all the viable still use that between r and 2 per cent of all crees if intestinal obstruction are due to grill stones. It is not in accordance with the earlier in 1 since which higher estimates of Courso ser

For purpo es of comparison all the case of in testinal obstruction at this hospital have been tabulated on the basis of etiology age of the patient morbidity and mortality (1 tible 1)

The mechanism by which the grill stone reaches the gastro intestinal trinct his been care fully studied. The process begins with chole cystitis and cholethinass followed by ulceration erosion and penicholecystitis. Adhesions form between the gall bladder or ducts and the surrounding viscera and perforation occurs within the adhe ions. Occasional fistula have been observed at operation with a large tone lying served at operation with a large tone lying

partly in the gall bladder and partly in the dodenum. By far the largest number of perforation occur between these two organs. Fistule have been found however between the gall bladder and the stomach jejunum ileum colon and unnary bladder also between the common duct and stomach or duodenum. Borroud quoted by Martin (7) reported a case in which 200 stones were passed by the urethra within a period of 8 days and the patient recovered. Elsner (6) pilo lished a report of a case in which postmottem

14BLE I —\\ ANALYSIS OF ALL THE CASES OF INTESTINAL OBSTRUCTION AT THE PETER BENT BRIGH\M HOSPIT\L

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examination disclosed a sinus tract leadin, from the gall bladder to a perinephritic absects which had subsequently extended to the kidney where it gall stone was found. Another had previously passed down the ureter to the bladder and been

voiced Perforations may occur without any attending symptoms. Reimann and Bloom (11) have published the autopsy findings of a pain at whe succumbed to empyema following lobar pneu monia. Although the patient was journal there was no previous history of gill blidder disease. Postmortem examination reveil 1 a biliary fistula between the gall blidder and pylora portion of the stomach. A calculu ab ut to centureters in diameter was located in a small cystic cavity of the stomach wall completely separated from the lumen of the useu.

Cases of intestinal obstruction by large all stones are on record however in which in fistula existed and the only explanation i that the stone must have passed by way of the biliary ducts. Murphy (9) cited an instance in which the common duct was diluted sufficiently to allow the passage of a stone 4 inches in circumference. Morgam quoted by Martin reported a ca e in which the common duct was diluted to the size it.

the stomach and filled with stones

Approximately one half the patients recover without operative aid. The stone is gradually forced onward through the small bowel into the colon and out through the rectum states of 125 cases 70 after various and repeated colics emesis peritoritis leus etc. were cured spontaneously by the passage of the stones per anum. In Wagner's series 04 passed the stone by rectum 150 were operated on and 8 died without operation.

The importance of early diagnosis cannot be over emphasized Martin states the diagnosis of gall stone ideus is seldom made with certainty. On the contrary Murphy believes that ileus due to a gall stone which has perforated through the gall bladder into the intestine may have no preceding jaundice but the inflammatory symptoms which accompany such a perforation ought to suggest the diagnosis. Three, of the 4 cases recorded below presented symptoms characteristic of the type of indigestion which so frequently accompanies disease of the biliary system. A detailed inquiry into the past history usually will enable one to make a correct diagnosis.

The chinical picture is that of sudden acute in testinal obstruction or recurrent attacks of partial obstruction. Visible peristalsis is rarely present Local tenderness as a rule is not marked sensi

tiveness beneath the right costal margin in the region of the gall bladder offers a valuable dag nostic clue in cases of recent perforation. Gen eralized abdominal spism is indicative of general neutonitis.

Suboutaneous and intravenous administration of alt solution before operation forms a very important adjunct in treatment. Or and Haden (10) have recently shown how seriously the body chlorides become depleted in patients with in testinal obstruction.

When toxemia is marked all supportive measures should be instituted before the patient is

taken to the operating room

The length and type of operative procedure depends entirely upon the patient's general physical condition. In a great many cases removal of the stone and temporary enterostomy should suffice This offers an additional advan tige in allowing free drainage to the toxic intes tinal contents retained above the point of obtura tion. If the bowel has been obstructed for only a short time the intestine may be closed with Cholecystectomy should seldom be con sidered Many patients relieved of their obstruction die because of an unduly prolonged operative procedure. The gall bladder may be removed at a later date much more safely and conveniently Latero enterostomy should likewise be avoided if possible Brown (3) advises removing the stone through a transverse incision in order to avoid such constriction of the intestinal lumen as occurs when a longitudinal incision is closed and in verted Davis (s) suggests transverse closure of a longitudinal incision

Statistics regarding the mortality are extreme by variable. The following table is striking

TYBLE II — A TABULATION OF THE MORTALITY REPORTED BY VAI IOUS AUTHORS FOLLOW ING OPERATIONS FOR INTESTINAL OBSTRUC TION BY GALL STONES

	Numbe f	v	t 1 ty
A th	op t	pe	t g
Nagner	150		48
Cour onser	125		44
Schuller	82		
He mann	92		56 63
Benning Wilms	64		33
Hon man	34		
Lobstern	31		61
Viceller	22		82
\aunyn	13		92

Although the majority of patients with acute intestinal obstruction by gall stones are stout women beyond middle life there seems little excuse for such an astoundingly high mortality. It

is probable that many lives could be saved by making an early dia nosis subjecting the patient to only the simplest operative procedure and in stituting proper supportive measures Bennett (2) has reported 3 cases with no deaths Wagner quotes Loerte as stating that all uncomplicated cases should recover Of the 4 cases recorded here recovered and 1 died of renal insufficiency and hyperglycemia

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Op 1 Rem lof gall sto f m lw J J m a d M t n t my f tet lobst t gs o yg na d oca n ths l c w m d th i m d bdom Wh the pet m wa p d a m ll m t f traw cl d fill b w l d t d d t b t 6 t m s t m ls f m lb w l d t nd d t b t 6 t m s t m ls t m s w s c l m ll fill b w l d t nd d t b t f D nd t m s d c d p t f t l p f collaps d lly f llow g th d l ted m l b o l p f collaps d lly f llow g th d l ted m l b o l p f lower juan m w f o d w th c h d o d m w a

firmly impacted. The intestine below the point was collapsed. Exploration of the upper abdomen r call damass of adhesions between the gall bladder and luo I num. The loop containing the calculus was delivered all doff from the operative feld and the stone remo e I through a small incision. I Vitter tube was sewed into the rat in the small bowel and the loop of intestine approximated the pertoneum by a few chromic satures. When the Vit torceps were removed a large amount of foul fe all les substance scaped from the proximal intestine. I small cit arette drain was inserted throu h the pertoneum to the region of the operative field. The abdomen was did with a few interrupted sutures in the pertoneum chr mc re inforced by silkworm gut in the fascia and ilk in the skin. The pattent left the table in fair condition.

The specimen consisted of a large brown gall st ne measuring approximately 3 5 centimeters in dameter. On section it appeared to be made up of many layer f cholesterin.

Postopraline oo se The patient made a far co n from the an wishten but became trattonal on the lrt das after operation. The urine contained no su ar la etc acid o actorio She was given d jutilas jul oose. I in sulin Systolic blood pressure fell to 85. On the second day she was nauscated and vomied several time. Dra nas, f om the enterostomy was copious. On the third day he did not respond well the skin was cold and clammy. The unne was still su ar free. Blood sugar was o 51 per c nt blood urea in tropen was roop milligrams per oo cub c entimeter. Di italis glucose and insulin were cont nu d Shed ed on the afternoon of the fourth po toperat e lay.

Very psy The gall bladder was shrunken and bound down to the liver and duodenum by many firm I bo us ad hesions. The wall was thick and the muco a n crotic. There was a pocket about the size of a walnut which had contained a lage solitary stone. An opening was found between the duodenum and the lumen of the gall bladder. A small probe could be passed into the pancreatic and hepatic ducts but the cystic duct was ent ely shrosed. A small irregular stone was found in the gall bladder near the beginning of the cy tie duct.

The duodenum was opened is in a low grade duodenuts was present. The mucosal surface was meet dedematous and stamed with ble A small acute duodenal ulcer i centimeter in dameter was found on the posterior wall about 6 centimeters beyond the pylorus

Case 3 A widow aged 72 yeas was admitted to the hospital complaining of spasmod c abdominal pain and vomiting

Past kidary. For to years the patient had been subject to mild indigestion characterized by belchin of gas sour crucations slight pain in the epi astrum and 1 it hypochondrium. These attacks bore no relat. In to meals Light months previous to admission he had one transient attack of sharp kinfe like pain in the 1 ht upper quadrant of the abdomen beneath the costal marg n accompanied by nausea and vomiting. She had never pa sed in 17 bloody or clay colored stool nor been jaundiced.

Pr s ni tills st. Three days before adm s on the pat ent was suddenly seazed with severe epiga trie pa in and somiting. The pain was c amp like in ch racter and recurding the pain was c amp like in ch racter and recurding the rounting to state of recently eather food but later the vomiting consisted of recently eather food but later changed to brownish wate y fluid. There was no faceal odor. Her box les moved normally on the is bt b fore the onset of the present illness. Subsequently she passed no faceal material but a small amount of flutus with the isd of enemate.

Plysic 1 xam nat on The patient vas a well developed and prese ved elderly woman lying in bed in some discom

fort Sbe re urgatated thin brownish sweetly smellin material from her stomach every few minute without retching and occasionally cried out with pair. Heart and lungs we normal Modomen as lightly die teil elb teil showed no vi ble perstals or localized swelline. Ther was diffuse tendeme is most marked around and just above the umbidu. The left low requadrant was dull topercu ion. No masses ere palpable. Durin the interval between pairs there was no spa m of the abdominal musculature.

Clinical patholo 1 On admi on the patient had a timperature of 964 de rees pulse rate was rr respiratory rate 8 Leucocyte count wa 9,400 hemo lobin 90 per cent Unine showed an occasional erythrocyte and a

few leucocytes per hi h poy r feld

P ope two disignost Acute intestinal obstruction due to impacted gall stone chronic cholecystitis and chole lith as s

Op all n Pemoval of impacted gall stone from termi al ile m for acute inte t nal ob truction incidental appendic

ectomy under ether an thesia

The abdomen was opened throu h a right paramedian in ision. No mal appearing transverse colon presented there w s a mod rately dilated loop of small bowel b lo it In the right that fo a a large gall stone was found im pacted a tile terminal ilcum a ain t the ilcoc ecal valve
I o imal il um was d lated. The stone was m iked gently up tard to a lort distance the loop containing the stone del ered into the wound and carefully walled off f om the operative field. Enterostomy clamp, were lightly applied abo e and below and the stone removed throu ha longs tudinal ne sion. The bow I wa repaired vith a continuous st tch of zero chromic catgut throu h the mucosa and submucosa re inforced by a similar stitch in lud n all laye s except the mucosa A no mal appearing appendix was then removed n the usual manner. The upper ab domen was e ploted and a very hard mas f lt beneath the right costal man, n Th consi ted of a thick cler sed gall bladder containin mult ple calculi and adherent to the duodenum and stomach The abdomen v as clo ed without draina e The pat ent was in excellent condition The calculus was about 2 cent meters in diameter cub cal and had large facette on t vo sides

Po lip rat a course. The patient an a slightly irregular lea ation in temp rature for t week and occas onally regur tated flu d and food. The pulle rate rapidly subsided normal. The wound healed $p \in p$ an O in the fitteenth postoperature day oent enological studies of the gastrome tinal tact showed a small hypertonic stomach. The duodenal cap filled will and empired freely. There were seve all indistinct that show just above the pyloru which were surge true of gall stone. No further surgery seemed all sable at that the me and the patient was dichaged.

CASE 4 1 married hite woman 56 years of a e ent red the hospital complaining of abdominal pain and complain.

At 1116 y The pat ent had theumatic fever when she as a years old and typhool fever ry years later Appen directiony was performed for acute appendicutes at the a of 43 and the abdomen wa drained Tor many years she had suff r d w th dull pain and di tress in the epigastr um fascous and sou erications coming on after meal and not rele ed by food Du n the year previous to the pre ent adms so in these symptoms lad become much mo e frequent and p is tent. She had never been jaund c d and had passed no bl ody tarry or clay colored stool. Her bo el moved d ly itho t cathar is Pear Ill. is The attach be an day be freadmission.

P exertil ss The attack be an day bef readmission with a dull gn vin pain in the pg trium which g adually became so se ere that the patient shricked with a ony tomit no commenced indicantial education.

teral Eahpmapeced dby y harp amp Ik p no the epg strimerd t gt tie mel s nd right l er abd m 11 om tus hal f lod If r bowel m d norm lly l fo th t fth Il Hrbower in n ss bs q tly h 1 d is n ll ha d too! ip t II d shed middle el mil es th n app re tolst Ch k eff 1 1 t sdr d'm de ately c t d ll t d l rmal blom a lahtly I t ded dty p toe pt th fl ks th bl p - i'i hft g 1 h 1 th [d ll ss fl d p t n 11 1 1 1 1 th LP, 15 t ttl pp llm m d tet d th 🗚 m pono d nth ht d I th old s admakdt 1 th ! dsgm d \ m p h 11 11 121 e m t t lptl CI l mı ĐΩ t 5 p t ומ vt ir ∞ ta pt f th n e e Prpled . Pr pled w \t t t l l 1 t l g g ll t mp t l th m ll t t 111 1 d Op l Rm lofall t f m l m f c t th nt t al b tru t 2 34 æ th Th pati t oo b t m 1 lut by hyr ml nt salt ու 90 ce tim te ly Ih p dth h l bd me 1 lt₁1 g th 1 Ιd 1 t mlttp t 1 1 t ally l talm, lil d a f d 1 h d m 1 ĭarii mlb ï d Im 1 It lly th t t e n m l 11 f lly w ll d if f m th a 11 1 l pwa 111 1 i lu em dth al 1 t t 1 d t Ih t ĩ ii, t e f t tth shilling h m dlt l a thus all ynth td i w of matt t) 1 m c sa dot Lihpt will ad lift th The li goo I g l'll th p d'gli dit 35 tm t ď t m t d m t fth f 1 of the ll It pp dt t bldd thillt d f tt d P top 1 Temp t d p rati minth thully mit g Bwlm d m lly ft the f th day The world be me pully ftlw dh led by se'd

C UMENT

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In the first case the diagnosis of intestinal obstruction by an impacted gall stone was obvious. Perforation undoubtedly occurred during the attack of abdominal pain and somtting one year previous to admission. It is well known that a gall stone may be dormant in the intestinal tractfor some time without causing any symptoms. The second patient presented no past history referable to di ease of the gall bladder and an accurate diagnosis was impossible. She did not succumb to the toxamia of intestinal obstruction but to hyperglycema and renal insofficiency. The third case illustrates the importance of an accurate interpretation of the past hi tory. If though no characteristic pain or jaundice had ever been present the type of indigestion which he patient described was entirely compatible with that which so frequently accompanies chrome cholecystiits and cholelithnass. In the fourth case it was necessary to differentiate be tween an impacted gall stone and adhesions at the site of the old operative wound. A detailed analysis of the past history turned the balance of evidence in favor of the former dia nose.

CONCLUSIONS

Cases of acute intestinal obstruction by impacted gall stones are not infrequent. The stone reaches the intestinal tract either through a per foration within adhesions between the gall blad der and some neighboring vi cus or by vay of the beliary ducts The clinical picture is that of acute intestinal obstruction engrafted upon a previous history of cholecystitis and cholelithiasi though a certain number of pati nts are cured spontaneously by passage of the stone the dan er of peritonitis is great and operative aid should be administered early The stone should always be removed and the absequent operative procedure limited to accord with the patient's general condition Subcutaneous and intravenous admini tration of saline solution is of di tin t value in combiling toxemia

BIBLIOGR APHY

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EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

FRANKLIN H MARTIN M D
ALLEN B KANNAEL M D
WILLIAM J MANO M D

Chief of I d toral Staff

SEPTEMBER 1928

ACCUMULATED BILE DISPLACING THE LIVER

UDDEN changes in intra abdominal pressure may occur secondary to op erative procedures altering the relative position of the intra abdominal viscera suffi ciently to produce a train of events which unless relieved may risk or take the pa tient's life. Acute abdominal distention is frequently associated with an increasing pulse rate lowering of blood pressure cold and sometimes evanotic extremities evidences of circulatory disturbances of considerable mag nitude 1 Relief of distention by resumption of intestinal motility whether spontaneously or induced by enterostomy or cacostomy usually associated with and followed by a return of the circulation to normal provided the factor of peritonitis does not exist Sudden increases in intra abdominal pressure resist excursions of the diaphragm and respirations are labored and increased. Here again with the relief of the abdominal distention and a return of intra abdominal pressure to nor mal limits breathing becomes easier and the rate of respiration is decreased

Such changes are rare however in the relatively innocuous chronic abdominal distention occurring with abdominal ascrites ovarian and princreatic cysts and subdia phragmatic abscesses the accumulation of which is slow enough to permit compensation for visceral displacements. Time and physiological adjustment play an important role also in the toremia of duodenal fistula and duodenal strisis. Active and intense in the acute stage it disappears as the condition becomes chronic

It should not be assumed that circulatory and respiratory changes occurring in such cases are due alone to alterations in intra abdominal pressure or to changes in the relative position of intra abdominal viscera for the effect of causative factors in intestinal stasis and the tovermia accompanying interference with intestinal motility without distention interjects elements which are difficult to interpret and may differ in each case

Occasion presented to study the effect of displacement of an intra abdominal viscus in a deeply jaundiced patient in whom the factor of causation was known and disturb ances in intestinal motility did not exist From 500 to 700 cubic centimeters of bile accumulated between the diaphragm and hver within I hours immediately following an anastomosis between the stump of the common bile duct and an opening made in the duodenum for the relief of a stricture involving the lower portion of the common bile duct An accurate anastomosis was possible because the common bile duct proximal to the stricture was about three times normal size. In the Il t C Cac t my f P | bt l f ll w g t pe t pe atio S g Gynec & Obst 9 7 xli 27 7

dissection of the stump of the duct from the under surface of the later preparators to making the anastomosis a small nick was made in the duct near the hilum of the liver which was immediately cloud with suture This was probably the point of cut of bile Although the area of the ana tomosi was drained sufficient bile accumulated between the diaphragm and the liver to cause di place ment of the latter

A syndrome characterized by an exceed ingly rapid pulse rate low blol re ure a rapid rate of respiration a collidamp kin and semiconsciousit s reulted from the down ward displacement of the liver producing in turn interference with circulation in the in ferior vena cava. With the patient in such condition opening of the abdominal incision in the patient room wa rewarded by the gushing di charge of bile from the irea be tween the dome of the liver and the dia phraem Immediate improvement charac terized by a drop of pulse rate from 165 to TIS a decrease in respirators rate and a return to consciousness occurred in a few hours From this time on convalescence was not complicated and complete recovery finally resulted

Experimentally it was hown that down ward displacement of the li er produces disturbances of the circulation in the inferior vena cava resulting in changes in blood pressure pulse rate and re pirator, rate simi lar to those which occurred in the patient Furthermore the removal of the factors dis placing the liver was followed both clinically and experimentally by the return to normal of the pulse rate blood pressure respiratory rate and by rapid and striking improvement in the general condition

WALTMAN WALTERS M D

Mal Nim dBllm JLR 1 f

THE EARLY TREATMENT OF FRACTURES

ECHNIQUE of operations and im provements in methods of treatment but of far greater importance in many morbid conditions are early diagnosis and prompt action The history of acute appendicitis and perforated castric and duodenal ulcer illus trates this very definitely. More recently we have seen great improvements in the end results of fractures. Much has been accomplished in the reinement of methods. The use of traction and suspension and a clearer understanding of the advantages and dangers of open treatment have contributed to better ing our results. But the main reason why the disability following these injuries is decreasing is that the medical profession and the public are realizing the importance of immediate action. In an overwhelming majority of ca es today the first entry in our records shows that - hours or - minutes and patient fell etc instead of - days We are understanding better what takes place at the site of fracture during the early hours and days after injury We are realizing that the golden opportunity for anything like exact approximation of frag ments is limited to that period before the process of repair in both bone and soft parts has really started. We have seen cases in which the attendant at the playground or the policeman in the park has accomplished a reduction which the experts might have failed to produce the next day. No longer do we wait for the swelling to go down -that terrible advice which came down through so many blind generations-but proceed imme

diately to restore as far as we can the normal

contour of the bones Fractures are being

regarded as emergency cases and given prec

edence over other less immediate problems

With the appreciation of what can be accomplished in the early hours we are also becoming less tolerant of improper reductions Many a 'satisfactory reduction of twenty years ago no longer passes muster but repeat ed or prolonged attempts are made. We may have to accent some shortening in oblique or spiral or badly comminuted fractures but any overriding in a transverse fracture demands explanation

Another reason for improvement in results is that with the more exact knowledge of the details provided by the X ray our attempts at reduction are much gentler than they were when the external signs and symptoms were our only guides. We no longer proceed by rule of thumb but make our manipulations along definite lines With more exact knowl edge of just what we wish to accomplish we are able to proceed with less additional trauma to the ends of bones and to soft parts

Lastly improved results can be attributed to a more definite realization of the fact that the soft parts are injured as well as the bone that treatment which is good for one is often bad for the other and that the maintenance of function of the muscles and joints during the period of repair of the bone will decrease both the amount and the duration of disability

More prompt action more exact replace ment of fragments by gentler means and more careful attention to soft parts are im proving results

The public is learning to come more promptly for help and we medical men are appreciating more clearly what we can do Nevertheless until this modern attitude is still more widely adopted the results of im properly treated fractures will continue to be blots on the escutcheon of American surgery WILLIAM DARRACH

MASTER SURGEONS OF AMERICA

DEFOREST WILLIARD

MONG Pennsylvania's most noted surgeons was the late DeForest Willard of Philadelphia. Dr Willard sfamily came to this country in 1637 His first American ancestor Major Simon Willard was one of the founders of the city of Concord Aussachusetts and was the first commander in chief of the British forces in America. Of his ancestors one was provost of Canterbury in 18 and another was baron of Canqueporte in 1477. Dr. Willard was also in direct descent of the third and the fifth presidents of Harvard College. From Massachusetts his branch of the family came to Connecticut the settlement in Newington being made by the grandson of Major Simon Willard.

Dr Willard was the on of Daniel H and Sarah Mana (Deming) Willard and was born at Venington March , 1846 He graduated from Hartford High School in 1862. He passed his entrance examination to Yale College but was unable to take up his college course on account of difficulty with his eyes. In 1864 he attended Jefferson Medical College in Philadelphia for one year. He was demed admy sion to the United States Ho pital service during the Civil War on account of his lameness but was accepted by the United States Sanitary Commission and saw service at the siege of St. Petersburg in 1865. At that time he was placed in charge of a ward at the Army Hospital at City Point and per formed all the services of a full surgeon. In 1867 he received the degree of doctor of Medicine from the University of Pennsylvania and was resident physician to the Philadelphia General Hospital for the next eighteen months. In 1860 he was appointed instructor in the University of Pennsylvania Medical School and from that time until his death he served the University as demonstrator quiz master associate professor and professor. The chair of orthopedic surgery was created for him in 1880

During his lifetinie Dr. Willard held many high positions in hospital medical and scientific associations. He was charman of the surgical section of the American Vedical Association president of the American Orthopedic Association president of the Philadelphia County Medical Society, and president of the Medical Board of the Presby tenan Hospital. He was also vice president of the International Congress of Fuberculosis in 1908. He organized and founded the Orthopedic Department of the University Hospital and this department is now



known by his name. He was organizer and surgeon in chief of the Widener Memorial Home for Crippled Children surgeon to the University. Presby terran Germantown, Jewish and Municipal Hospitals consulting surgeon to the Atlantic City Hospital Children's Seashore Home for Incurables and Home of the Merciful Saviour. In 1876 he was assistant medical director to the United States Centennial Exhibition in Philadelphia.

In addition to his purely professional work, he was on the board of managers of the University Hospital Pennsylvania Training School for the Feeble Minded Union Benevolent Association Academy of Natural Sciences New England Society and the Young Men's Christian Association

Dr Willard was a voluminous contributor to medical literature most of his writings dealing with the specialty of Orthopedic Surgery in which he wis most interested. Be idea numerous other articles he wrote the chapters on Orthopedic Surgery for the Ashhurst International Encyclopedia of Surgery and in 1910 published his book on the Surgery of Childhood which is considered an authority on the subjects of which it treats

Dr Willard was never known to neglect any of the offices or the many positions which he held in his long career. He possessed an unusual degree of surgical judgment and operative skill to which was added a remarkable personal magnet ism. Among his university students he was beloved because of his high ideals and constant kindness.

He received the honorary degree of A M from Lafay ette College in 1882 and Ph D degree in 1885. He was marined September 13 1881 to Elizabeth M Porter daughter of the Honorable William A Porter and Emma (Wagener) Porter Dr Willard died at his country home at Lansdowne Pennsylvania on October 14 1910 DEFOREST P WILLARD

THE SURGEON'S LIBRARY

OLD MASTERPIECES IN SURGERY

BY MERCED BROWN MD FACS OWN NEBRASA

THE TETP ABIRLION OF ACTIUS OF AMIDA

I N the I ttle town of Amid n the valley of the upper Tig 1 Ri er stuated Viesopot mia somewhat e t of Capp d cea northeast of Ur of the Chalde s and south v st of Mount A a at Actius was born p obably in the early part of the sixth century The lo Ity as I mous at this period and its history g b ck far into anci nt times being important in Oll Test m td v for if one looks at an old Bibl I man h near it Niney h C esar Mount \ at th upper Euphrates Rvr and many thr n mes mad n Bibl stor s M re than famila by th this the city has persit dito mid in time ing a Roman of I to n th th d c ntur it as sacked by T mur th Fartar kn vn s Timur the lame the T m la of th plays to vard the clos of the fourt th ntu v and c ptur d by th Turks in 55 It is no apt of Ast Frk s kno n Diarbek Kar Amid dint dfor dı n t d for kno n its output of b autiful m occo

In the d vs of \ t u the tv of Am I w ject to Kome C stantin the (r t hal declar d Christianity the relico 1 th Stat and tais ferred the curt t Byza t m In this v v great once more this land as at duth and nth tory flourished thir n we imp rtanc and hat there was of t and s ce I ht atur as distrib uted over that port f th orld aching from Constantinople south a t th ugh Asia Minor nd ı` thence w t ard to Al As the temporal power ndits cout a dri l from the methods of ancient Gr ec and Rom os nce came from the same sourc and ted largely of inherited ideas dd d The Roman Empire was with bittle d indl g and had ily lost to pour A new orld domination coming on and und r such circumstance th furth rance of s tihe matt is

circumstance th furth rance of s the matt is was of looked upon th great fa by the rul rs. Vetus was Christ an subject of the Emperor Justini n. He stud d m d in t. Wand a and after some v. ars bee me el. s.ly connect l with the court at By antium which he had the per all physician of the Emperor and an offer of the imperial household a don of the geat med limit of his time. His work is a compilation if the medical kno ledge handed dow. Irom the a ci nt Gr ks modified by Celsus and Golan and to a lesser e tent

by h s immediate or decessors and hims if In it he tries to cov r all parts of medicine but does not nav a great deal of attention to surgery He states howe er that he has expla ed some of the sure cal work in another tre ti but this has never been found Written in Gr k the work vas first trans lated into Latin by Montan's and Cornarius and appeared in 1534 Subsequently the entire work vas translated into Latin by Janus Cornar us who i as born n Zwick u was prof ssor at Marburg and a and is known principally for his I atin trans lations of the e ly Grek authors This volume first appear d published at Basl in 1542 by Froben the Cornarius t anslation is allo included in the If dicae I tis P pes of Henricus Stephanus (Henr Esti nne) printed by Huldrich Fu ger in

Virus entitl shis work. The Tet abiblio the four books. Tach of this is did ded into four less rooks or sermons thus making sixteen e haustive looks or chapters in all. Her less constitute that the did not show the did not show

Throughout the entire work the supersitious I'l gous behies of the early Christians are evident Salves and plaster are made to the accompaniment of prayers and incantations and these same elements play a cons deruble part in therapy. Whin describ high a considerable part in the therapy. Whin describ high can be also as you have gotten the patient quest and ordered him to listen to you say. Come out bo e (if it s a bone or call it what it is it is a long to the patient qual that gives that diew Lazaus from the sepulcture and Jorah from the whale the ataking held of the patient is thought a last suc the

ser a t and martyr of Christ command youeither come up or go do vn
Actus pr served for us the b st of the w rk of the

medic I men of the early Chr stian Era and though not an original thinker like Paul of Argina nev r theless he played an important rôle in med cal his tory

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complecteres jut fint in furma quatuor fermonum
quaterniones idelt fermones xvi per lanum Cornanum Medicum Physi
cum Lanneconferipu



REVIEWS OF NEW BOOKS IN SURGERY

CHINZ and his collaborators have written one of the most comprehensive and pretentious vorks on roentgen diagnosis that has ever been sublished It covers the entire field with exception of obstetrical and gynecological diagnosis and in corporates most of the more recent developments in ocntgenology There is a wealth of detail contained n it usually found only in books devoted to special pranches of rountgen diagnosis. It is profusely llustrated with complete legends which in them selves offer a liberal course of instruction printing is excellent and the paper used tend to bring out the illustrations to the best advantage Very little space is devoted to technical problems except where they have a direct bearing upon interpretation. Where a special technique is needed to render the roentgen examination effective this is described in detail

The section devoted to bones and joints deserves particular commendation. The roentgenographic findings of normal and abnormal conditions are correlated with the anatomical and pathological changes in a most instructive and valuable manner Variations associated with progressive and retrograde changes are indicated. Articles on bone and joint lesions in infants are included by flotz and Looser has contributed chapters on chondrodystrophy late rickets osteomalacia osteogenesis imperfecta exists and giant tumors and cretinism

Less detailed consideration has been given to le sions of the skull mastoids and pranasal sinuses Ulrich bas a good article on the sphenoid bone and internal ear and Juengling bas covered the subject of ventriculography in a thorough and complete manner Myelography with iodized oil is also discussed in detail Foreign bodies in the eye are considered but no mention is made of any exact methods of localization such as are commonly used in this country.

Lesions of the thorax are adequately covered and the chapters devoted to pulmonary tuberculosis are especially complete. The role which the roentgen examination plays in determining indications for operative protedures as well as the findings after operations on the lungs and chest wall are taken up at length. Ulrich has included the use of iodized oil in his contribution on the bronch. Discases of the lungs pleura large vessel and mediastinum in adults are discussed by Liebman. Hotz his special articles on the heart in infants and on the thymus

The normal anatomy topography and physiology of the various parts of the alimentary tract as far as they have a bearing on roentgen diagnosis are discussed exhaustively Such pathological conditions

as ulcer and cancer have received masterly considera tion and the roentgen findings are discussed in relation to operations contemplated or completed Hotz has contributed an article on the roentgen ex amination of the gastro intestinal tract in infants calling attention to the limited value of this method The space devoted to the consideration of the appendix is exceedingly small and the value of the roentgen examination in connection with it min imized Pneumoperitoneum is discussed as to in dications and findings Gall bladder examinations are covered at length by the direct method as well as with the aid of the opaque meal and Graham Cole test A rather condensed but nevertheless comprehensive discussion of the roentgen findings of the urinary tract completes the volume

The book as a whole is a well conceived and claborated exposition of roentgen diagnosis as generally accepted at the present time. It contains a fairly extensive bibliography appended to each special subject made up largely of European authors. As a reference book it will form a valuable addition to any medical library.

ADOLPH HARTUNG

HUNTER TODS book on diseases of the ear revised by Catheart is a very useful little volume. It is intended for senior students and general practitioners. The style and arringement of material are very simple. The text is easy to read and the essentials on any subject are found without a great deal of searching. There are 4 very good col ored plates. The 87 illustrations add a great deal to the forcefulness of the presentation.

The subject of inflammation in the middle ear is covered in 50 pages of this book of 325 pages. This important subject is treated in all of its essential points. Special attention is paid to otitis media in infants. It is stated that in infants under 3 years of age postmortem examinations in a series of 100 cases have shown the presence of otitis media in 50 per cent of all cases in which it was not suspected in life.

Disease of the mastoid is covered in 45 pages. The technique of the mastoid operations is well described with the aid of drawings.

This book has accomplished the purpose for which it was written but would be of small interest to the specialist

ELLISON L Ross

THE third part of the comprehensive work on the surgery of the ear nose and throat by Moure Liebault and Canu, t has been published. The first

and second pa ts on the ear the pose the accessory sinuses and the nasopharyny have already ap pea ed A fourth part on the laren and esophagus i in the press

Th desire of the authors has been to make the ork a p actical treatis on the mouth and pharyou -including the hipopharing In the urg cal t chn que they have limited themselves to typical ope ations and to those perforned by Irofessor Mou e at Bordeaux They has mich d d the ind cat ons and contra in lication as well as the neces ary in truments to be employ d and due regar lis given to compl at ons that may ar se The illust ations are numerous and g od

The de emptions of the variou diseases are marked by that brevity and clearness o charae ter tic of F ench medical write s To g ve a typical e ample one can pont to the brief and one se de e upt on of sept c phlegmon of the floo of th m th (Lud v g s ang na) wh ch res lts in a pietu e

one do not ea ly forget

Thi i a v lume the l ungologist and g neral urg on will ead with pleasur and will keep on hand f future reference IGROVILLEDY

THE th I edit on of Eden and Lockyers 1 Gy in ology s ell arranged an I accompanied by an a leguate n mber of accu ate illu trati ns

The book is hived d to three parts Part I embr c desc ipti e a atomy embryologi dis orde f menst uat on tubal pr maney and the general subject of nf ctions Thi sect on is especially compl te and very will pres nted. Me struat d so d s in pa ti ular are th' ougl ly d scussed

Part II s devoted to r gional genecology It in ludes d seases of the c ternal gen tal a the uterus and the tubes and ova ies Empha a is placed on man subjects which ar diemed of lesser importan e by the modern 1 er an school of gynecology but on the wb le the presentations are attractive and a cur te Mo e extens e consideration of the ubject fe domet osis and le si ace devoted to endomet it: would make a stronger appeal to the American reader

Pa t III is d vot d ent cly to technique The gene al p in pl s of unifo mly accepted procedures

are vell pr ented

On the h le the text clea ly and conct elv v itten and has been at e 5thened by rev sion. It ll perhaps nak a less trong app al to the Am ican gone log t th n to his Engli h confr res ANTHUR H CURT S

THE a tho d dicat his book on The Ext O is M sci to his students and explains in

the p eface that t1 an amplification of h s lectures G S To MT S MP CT B Th m d C hb Lok MD BS FRCS FRCP dd N w L K Th M mll Cm y g 8 TEOMBI A O. M Bi Phidlph Le & Fbg 97 BLH CP AN MDSD

given in the Graduate School of Medicine of the University of Pennsylvania Certain other useful onthalmological monographs have originated in a imilar manner

After a r tical survey of this work one realizes that the author has succeeded admirably in his en dea or to crystally e and at the same time simplify accepted facts in this perennially difficult and com plex chapter of ophthalmic science. The subtitle

A Clinical Study of Normal and Abnormal Ocular Motil ty is a good des gnation of the scope of the book Such a title as Th Fytrinsie Ocula Mus cles rather than The E t a Ocular Muscles might pro e to be more acceptable choice of

The authors ripe judgm nt on many control versial points regarding the evaluation of certain o thoptic and also surgical measures adds greatly to the interest and value of the treatise

W I MONCREI

MACAUSLANDS P lior velilis is an excellent and useful comp n jum of all that s known about infantile paralys s and is p esented in a co ei e and interesting form. The history of p st pidemies and the probable mode of communicatio is up to date. The methods of treatment in the various stages of the disease are clearly giv 1 in detail The r sults of the var ous forms of mechan ical educational a d operative treatment as ob served in the author sext insi e experience are ven without bias and are presented with the j dgme t of a careful and conser ative orthoped e su con

This book can be recomm nded to all phys cans t ho a e interested in the p oblems connected tith FOWIN II RYERSON

anterior pol omyelitis

PROFESSOR HENRY bas given us exact direc t ons for the best e posu e of the humerus radius femur and ulna n h Expost es of Lig Bo s and the Sig al Wellods H ante or method of approach to the femur instead of the eustomary late al exposure is of particular interest He descr bes it as respecting anatomy as b g relatively bloodless and as giving a wide and c vement exposu e The illustrations make the method admirably clea

In the latter section f the book the uthor describes sposue f the plantar stru ture method of l gat ag the second stage of the vertebral arters a method f light g the first stage of the left subelavian artery from b hind the cup and ball aneurism needle fo deep ligations a n method of re ect ng the left cery codorsal ganglion

of the symp that c and ning nious in trum nt for pituitary surgery hich s med at the pitu tary ĥν tbe λ aν

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Cmp y 7 In the words of Sir W I dcC Wheeler in the fore word of the book the author has provided a valuable contribution to the reference library of the scientific surgion Frederick Christopher

STLRI ING V MI AN has written a voluminous bool on discress of the mouth consisting of 560 pages contribing about 300 illustrations. It is a very complete work in that nearly every lesion and malformation occurring in the mouth is given consideration. The arrangement is very formal synonyms and definitions being given before the dicussion of the etiology, symptoms diagnosis and treatment of each case. For some purposes this is an admirable arrangement but for the student who wishes a complete knowledge of a specific mouth condition the text hardly fulfills the requirements. Here, is much repetition and some of the more important phases are slighted especially a clear discussion of treatment.

The views expressed are generally sound and logical however and the illustrations are beautifully prepared and nicely supplement the text. An extra sive bibliography accompanies each chapter and credit is properly given for all material used. Altogether, the book has been painstakingly prepared and should be a valuable addition to the library of the physician as well as the dentist.

CHARLES W FRECMAN

I he preface to his short history of surgery 2 Dr von Brunn evils attention to the paucity of books on the historical aspect of surgery apart from general medicin. He says further that the volumes devoted to surgical history alone are exhaustive truatises designed rather for the specialist in history than for the active clinical surgeon. This condition of affurs has prompted him to produce this work which is designed to cover the major points in the development of surgery from prehistoric to modern times. The vuthor has done his work well and has accomplished his purpose. Written in not too in volved German and with illustrations well chosen the book gives an excellent survey of the subject without going into too much detail. It will prove a welcomed addition to the library of the clinical surgeon interested in the history of his art.

ALFRED BROWN

COLE in his book has presented a convincing exposition of the value of clinical research. The originality of his methods and the weight of his conclusions are stimulating and profitable to the reader.

The author has made a careful study of the function of the parietal peritoneum and of muscular

 rigidity. He finds that irritation of the non-demons tratite area of the peritoneum does not lead to rigidity and points out that rigidity of the abdominal will is not an assential sign of appendictis.

The chapter on cutaneous hyperasthesia in acute abdominal disease is very interesting. The author found hyperasthesia of greater or less extent in 50 per cent of 185 cases of acute appendicitis. He feels that this symptom can almost always be taken as signifying inflammation or irritation of a viscus or of some nart of the pertioneum.

The study of phrene shoulder pain reaches a conclusion somewhat at variance to that of Capps namely. There is an important localizing correspondence between the part of the disphragm ritiated and the position of the referred pain on the shoulder. Irritation of the antenor part of the disphragm causes pain in the corresponding clavicular or supraclavicular regions irritation of the posterior part of the disphragm causes pain in the supraspinous fossa of the same side irritation of the top of the phrenic dome causes pain in the corresponding acromicolavicular regions and finally pain felt over both shoulders indicates a median

The differential diagnosis between acute thoracic and acute abdominal lesions is handled most in terestingly. A chapter is devoted to the genito urinary symptoms in acute appendicitis. The

diaphragmatic irritation

urinary symptoms in acute appendicitis. The femoral test for hypogastric peritoritis should prove of value. The sections devoted to subacute perimephritic absees occurring without disease of the kidney and to the extremely interesting subject of extravasation of bile are based upon abundant experience and greatly enhance the merit of the book. The final chapter is a critical examination of the subject of shock and collapse. This small but extremely valuable book should be in the library of every surgeon. Frederick Christopher

THE translation into English of the infth edition of Professor Hajels is classical work, on the usual accessory sinuses' is sure to receive a warm welcome. The publishers are to be congratulated on giving us more easily handled and attractive work by issuing the translation in two parts instead of one us in the original. The printing is clear and the reproduction of the illustrations leaves little to be desired.

The introductory chapters on the anytomy of the smuses have numerous well chosen plates illustrating the important variations. The descriptions are clear and concise and one notes with approval that the author emphasizes that no plates no matter how good can take the place of frontal and sagittal excetions of the head. The various sinu es are fully described. The final chapters deal with the complications involving the orbit and visual organs and cerebral complications. The anatomical variations in the sinuses lead the author to the differential

diagnos: in diseased conditions and the surgical technique who them ay best be emply 1.1 The chip ter on symptoms is especially valuable. Here the author has util ed his great of it neal experience extending over so many years. The abundance of the material at his disposal afford ample opportunity to select appropriate cases. There are numerous footnotes of value with brief revy yol recent hiteratur and a valuable be libergraphy.

The paragraphs on headaches i sams trouble is charact sitscally conse vat v Wh ha not in in I to make the assertion that all cases of nervou and habitual headaches are of na al origin he behi es that n headaches should be cepted as er ous until a detailed examin too of the no and inue shas he nade In the chapt r dealing in the tiology and pathological anatoms of the m vill varieties of the paragraphs dealing it this relating the technological continuity to provide the provided that the provided in the provided in the provided that the provided in the provided that the provided in the

The translation has ben ell lon a 1 the English speaking special t ll b gldt ha e so author tativ a k ths liposal

J Gord W Ls

A TWO volume rk on \ a diag f th stomach and duod um under th up r 1 i n of D aland other Fr nch auth e ch f who a leade of the sp cialties f me is ne rec a l ontgenology sa valuabl allt to \ 1 b blig aphy To the phecine horieng gli to \ 1 Y ray inv stigations of the dige tive tat the se books will have an especial appeal the various I sio s that are dem nst abl b \ra hal re give in half to illu tration acc mp ni ltv a li e diagram and a l ta led d script on a part u la ly commendable f ture be aus of th atur of Y rave de ce in the daily poblems of mel al and surgical diagnos Splendid Y raville trutens and lucid descriptions make o e wish the a English t anslation ere available for the wh ch guistic attainm nts do not includ the Fren h language M ny of the va sous path log cal ondit n shich occur in the stomach and lud un are pr s t l in log cal divisions

Wille the title Mr r S s y gg t uch subjects a par nv ha ing o n t ail fu tuncle and the like the content of H rt ber t vt cover a mater ally br ad r scope than have found in any sim label p usly encounter I

The fit tt o chapit !al viths girell mat ril suture! I gatur dr ngs bandag ng ete Chap t s n hæmorrhag liransfusion and nf ctions f lio The ch pr son dis asses of the lip t ngue a s lisea es nd njuries of the face and n k ar evcellently do e The more common c n li to s of chest and abdominal wall a e presented Then fol

J Ch R H BUR T P M 1 C T V L V C M P C M P C M

los chapters on the spine anal reg on and genita. The remun le of the book is devoted to the surger of the extr mit es including such lessons as burr sprins in fetions of ten lon sheaths and burse. It is quit unusual to ee no e book so wide a vanety of subject ranging from bandaging through mumerous special feld of surgery unology and gwiecology so will pre-ented an it so excellently full trated. If or the student in the out patient chinic and the interne this is a very valuable book.

If B Bee in per-

WHEN one consilers the tremen lous task in trations the culting senting with appropriate illustrations the culting subject of surgery under one cover in a volume of a thousand pages or so the receives should be more tempted to commend the good points of the tat than partially to critic zee the bad for this gene ally agg 1 that ye can neither learn nor to shourcery for an text

A hhu is bo k is rather diffe ent from most texts on urge; In the first ect on under the healing of cc eral's regry is included inflamming surgial und ction tumor; juries amputations and re on tructic surgit. The econd scile of garded by terme Surgery coves the a cultar and lyn phatic syst ims bones joints and orthop li urgit. In the third sect on devoted to R gio all signs, when died, the devoted to A in the under the devoted to A in the under the devoted to A in the under the devoted to R gio all signs, and gentlal a are

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Ih ubject matt ris v II abreast of current ad
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cell in E gli h an I i both east and pleasant to
al. The illustrations are vell chosen and well
din. In gineral this is as satisfactory a book for
tudents of surgery as ne coully ant

J R Buchbi der

IN the fourth ed u n of Th. 1 t of Institute I lings he endeavo ed to bring the volume abreast I the day. The drug u ed and the different meth ods empl ved for both local and g neral anaesthesia at the pre-nt time at s i forth in an organized ligical form. This makes the subject elear even to he beginner in anaesthesia. Some velse are expressed in eggl 1 to the open drop method of therrustion that cunnot be subsected to by many anaesthet its I vide up rence. The reviewer is forced to the cond so not hat the author has ben unfit unnite in witnessing the method improperly employed.

In chapter on ethylene is incomplete in that no meth lofg our ling to prevent eller ostatic sparks fom pro lucing explisions i discribed. The state me tihitethylene is not sife froperative obstetries i contri vit the eigenfactor of many competent ob ricr

The great importance of the position of the patient during anæsthesia and the different causes of obstructed breating are recognized and means for their correction are fully worth reading especially by the inexperienced administrator of an esthetics.

The chapter on The Lout of View of the Patent is well worth the space given to it. Fo the lack, of appreciation of the patient's point of view is due much of the unintentional cruelty too often exhibited in this day of high pressure and hospital routine earned to extremes The author very correctly states. In adopting the patient's point of view we climinate much pain and distress A word a smile or a sympathetic glance will do much

to lighten anxiety and pain—before operation
This book will be of value to the medical student
interne and general practitioner and will be read
with interest by the specialist in anaesthetus

ISABELLA C HERB

AUTHOUGH this book of Alvarez on the me chinnes of the digestive truct's stermed a scond edition it is actually a new book when compared to the first edition. The author discusses thoroughly the mechanical phenomena of the digestive tract from a biological and clinical standpoint in a clear simple scientific and interesting munner Explanations are offered for many of the symptoms observed in gastro intestinal discusse to an extent that can be found in no other book. Many of the phenomena are interpreted from the viceypoint of the author's metabolic gradient theory which he fully recognizes is only tentative at the present time. The book includes an excellent bibliography of 900 titles and

frequently at the end of a discussion the reader is referred to monographs which deal in more detail with the subject discussed. The book is not only a valuable contribution to the science of gastro enterology but will be of great value to the student of physiology the internist and surgeon.

A C Ivy

PLDIATRICIANS deserve great eredit for having called attention to the fret that in illness the child must not be regarded as a little adult that not only do the pathological pictures differ but that the reaction of the child to pathological changes is often entirely different from the reaction of the adult. The same is true in the so called surgeral disease is. Not only do certain conditions such as cutte intussusception or idiopathic hypertrophic pyloric stenosis arise in the child which are not seen in the adult but certain other conditions such as acute appendicatis often show a different symptom complex and run an entrily different eourse

In his book on the 1bdominal Surgery of Children Barrington Ward has emphasized the chrivateristic features in the chology symptomatology and treatment of the surgical conditions of infance and childhood. He has confined his work to the diseases of the abdomen. In a short, well illustrated clearly written hittle book he has presented the saltent features. The book is recommended to those surgeons who do not have the opportunity of observing a large amount of the surgery of children and who will find in this book much that is useful and helpful. Those surgeons who do have a large amount of clinical material among children will find in this book much that is of interest.

BOOKS RECEIVED

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CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

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FRANKLIN H MARTIN Chicago Director General

BOSTON COMMITTEE ON ARRANGEMENTS

FREDERIC I COTTON Chairman

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HAROLD WALLER WYMAN WHITTEMORE HANS ZINSSER

PRELIMINARY PROGRAM FOR BOSTON CLINICAL CONGRESS

BOSTON PROGRAM IN BRIEF

Monday October 8

10 00 Hospital Conference Ballroom Copley Plaza Hotel

2 00 Clinics in the hospitals 2 00 Hospital Conference Ballroom Copley Plaza Hotel

8 15 Presidential Meeting Symphony Hall Tuesday October o

9 00 Clinics in the hospitals

2 00 Clinics in the hospital 8 15 Scientific session Ballroom Copley Plaza Hotel

Il ednesday October 10

o oo Clinics in the hospitals 2 00 Clinics in the hospital

8 30 Boston Surgical Society presentation of Bigelow Medal Ballroom Copley Plaza Hotel

Thu sday Oct be 11

9 00 Clinics in the hospitals oo Clinics in the hospitals

2 00 Annual Meeting Ballroom Copley Pla a Hotel

3 30 Symposium Treatment of Malign at Diseases by Radium and \ ray Copley Pla a Hotel

8 15 Scientific session Ballroom Copley Plaza Hotel

Frid & Octob I

900 Clinic in the ho pital

2 00 Clinic in the hospital

2 30 Symposium on Traumatic Surgery Ballroom Cop ley Plaza Hotel

8 15 Convocation Symphony Hall

OR the eighteenth annual Clinical Congress of the American College of Surgeons to be held in Boston from Monday October 8 to Friday October 12 inclusive the surgeons of Boston have planned a highly attractive program of clinics and demonstrations The program is ample and varied and with increased clinical factlities a record breaking attendance is expected at this year's meeting

A preliminary program of the clinics and dem onstrations as prepared by the Committee on Arrangements is presented in the following pages During the weeks preceding the meeting these schedules will be revised and amplified so that the final program will completely represent the clinical activities of that great medical center in all departments of surgery The real program of the Congress will be issued daily Each afternoon there will be posted at headquarters in the form of bulletins a complete and accurate schedule of the clinics and demonstrations to be given on the succeeding day Printed programs will be issued each morning

The subcommittee in charge of the section on surgery of the eve car nose and throat has pre pared in addition to a series of clinics and dem onstrations at the hospitals which will occupy the morning hours of each day a series of clinical demonstrations for Fuesday Thursday and Fri

day afternoons to be given in the Georgian Room at the Statler Hotel A detailed program therefor will be found in the following pages A special session on Wednesday afternoon will be devoted to a symposium dealing with the standardization of the eye ear nose and throat departments in

g neral hospitals

General headquarters for the Congress will be established at the Statler Hotel where the ball room foyer and other large rooms on the mezza nine floor have been reserved and will be used for registration and tucket bureaus bulletin boards technical exhibition executive offices etc. The ballroom at the Copley Plaza will be ubited for evening meetings hospital conference annual meeting and other large gatherings.

An important feature of the general program for this year's meeting will be the showing of several surgical films that have been produced under the supervision of and approved by the American College of Surgeons A number of films are now complete while others are in course of preparation and will be ready for their premier

showing in Boston

Arrangements have been made for the celebra ton of Ether Day at the Massachusetts Gen eral Hospital Friday forenoon. Evercises begin ning at 10 o clock, will be held in the dome room of the old building of the hospital where ether was first administered for the production of surgical anaesthesia on October to Fa§6. A bronze bust of William T. G. Morton will be presented to the hospital.

The annual meeting of the Fellows of the College will be held on Thursday afternoon in the ballroom of the Copley Plaza Hotel beginning at r M. Reports of officers and standing commit tees will be presented and officers elected for the

ensuing year

Immediately following the annual meeting there in the presented a symposium dealing with the treatment of malignant diseases with radium and V ray under the leadership of Dr. Robert B. Greenough of Boston Charman of the Committee on the Treatment of Malignant Diseases A special report on the treatment of cancer of the

breast is to be presented
Friday afternoon s session in the ballroom of
the Copley Plaza Hotel will be devoted to a sym
posium on Traumatic Surgery Leaders in indus
try education and labor together with repre
sentatives of indemnity companies and the medi
al profession will contribute to the discussion. A
report will be presented by the Chairman of the
Board on Traumatic Surgery as to its activaties
in the present year. A defunite program has been

adopted hy the Board and put into effect. The results of the investigations made during the year will be presented.

At the Tuesday evening meeting Sir Squire Sprage Editor of the London Lancet will deliver the Hunterian oration. A symposium on the transplantation of urcters with papers by Drs Charles H. Mayo. Robert C. Coffey, Arthur H. Curtis and others will be a feature of the Tuesday evening meeting.

At a special meeting of the Boston Surgical Society on Wednesday evening at which the visiting surgeons will be guests of that Society the Bigelow Medal is to be presented to Professor

Chevalier Tackson of Philadelphia

Sir George A Syme of Malvern Australia president of the Australasian College of Sugoes will be a guest at this year's Congress. Other distinguished surgeons from abroad who will attend are Professor Archibald Voung and Dr Farquhar Macrae of Glasgow Scotland Sir John Lynn Thomas of Llechryd Wales and Sir Charles P B Clubbe of Sydney Australia

EVENING MEETINGS

Programs for exening sessions on each of the five days of the Congress are being prepared by the executive committee of the Congress. At the Presidential Meeting, in Symphony Hall on Mon day evening the president-elect Dr. Franklin H. Martin of Chicago will be inaugurated and de liver the annual address On the same evening Professor Vittono Putti professor of orthopedic surgery in the University of Bologna Italy and Director of the Pizzoli Institute will deliver the Murnhy Orton on Surgery.

On Tuesday Wednesday and Thursday eve nings the sessions will be held in the ballroom of the Copley Plaza Hotel The annual Convoca tion of the College will be held on Friday evening in Symphony Hall at which time the 1928 class of candidates for fellowship in the College will be received The fellowship address on that occasion is to be delivered by Dr William J Mays.

ANNUAL HOSPITAL CONFERENCE

For the eleventh annual Hospital Conference of the Amencan College of Surgeons an interesting sense of papers practical demonstrations and round table conferences that deal with many of the problems relating to hospital efficiency has been prepared and will be found in the following pages. The conference opens at 10 octock on Monday morning with a session in the ballroom of the Copley Plaza Hotel Morning and after moon sessions in the same room are planned for the following days. The program has been ar ranged especially to interest surgeons hospital superintendents trustees nurses and hospital per sonnel generally and a cordial invitation is extended to all persons interested in hospital work to attend

The session on Wednesday afternoon will be of particular interest to those whose practice is limited to surgery of the eye ear nose and throat being devoted to a discussion of the principles in volved in the standardization of such special departments in general hospitals

SPECIAL TRAIN FROM CHICAGO

For the convenience of Fellows living in the central and western states who will attend the Boston meeting arrangements have been made with the New York Central Lines to provide a special train leaving Chicago at 9 AM on Sunday October 7 arriving in Boston at 9 AM on Monday The special train will be equipped with all steel cars of late design including club compartment observation sleeping and dining cars No extra fare will be charged The special will arrive at Cleveland at 5 28 P M making con nections there with regular trains over the Big Four from Indianapolis and Cincinnati arrangement is contingent upon reservations for such a special train being made by the minimum number required by the Interstate Commerce Commission rules Fellows are urged to make their reservations for the special train at the earbest possible date

REDUCED RAILWAY FARES

The railways of the United States and Canada have authorized reduced fares on account of the Boston session of the Clinical Congress so that the total fare for the round trip will be one and one half the ordinary first class one way fare To take advantage of the reduced rates it is necessary to pay the full one way fare to Boston procuring from the ticket agent when purchasing ticket a convention certificate which certificate is to be deposited at headquarters for the vise of a special agent of the railways. Upon presentation of a visued certificate to the ticket agent in Boston not later than October 16th 7 ticket for the return journey by the same route as traveled to Boston may be purchased at one half the regular one way fare

In the castern central and southern states and eastern provinces of Canada tickets may be pur chased between October 4th and roth in south western and western states between October 3d and 9th and in the far western states and western provinces of Canada between September 30th and October 6th The return journey from Boston must be begun not later than October 16th

The reduction in fares does not apply to Pull man fares nor to excess fares charged for passage on certain trains. Local railroad ticket agents will supply detailed information with regard to rates routes etc. Stop-overs on both the going and return journeys may be had within certain limits.

Tull fare must be pud from starting point to Boston and it is essential that a convention certificate beobtained from theagent from whom the ticket is purchased. These certificates are to be signed by the general manager of the Clinical Congress and viseed by a special railroad agent in Boston during the meeting. No reduction in railroad fares can be secured except in compliance with the regulations outlined and within the dates specified. It is important to note that the return ring must be made by the same route as that used to Boston and that the certificate must be presented during the meeting and return ticket purchased and used not liter than October 16th.

An exception to the above arrangement is to be noted in the case of persons traveling from points in the Pacific Coast states and British Columbia who will be able to purchase round trip summer excursion tackets which will be on sale up to and including September 30th with a final return limit of October 31st. The summer excursion fare is somewhat lower than the convention fare men tioned above but is available only in the Pacific Coast states and British Columbia. Tickets sold at summer excursion rates permit traveling to Boston via one direct route and returning via another direct route with liberal stop-over privaleges.

BOSTON HOTELS AND THEIR RATES

Since the last Clinical Congress in Boston in 1922 a number of new hotels have been built including the Statler with 1300 guest rooms the New Parker and the Ritz Carlton Some of the older hotels have been enlarged so that there are now ample first-class hotel accommodations in Boston for all who wish to attend the Clinical Congress Many of these hotels are located within short walking distance of the headquarters hotels

	R t w S gl Room	th B th D bl Room
Bellevue 21 Beacon St	\$4 00	\$7 00
Braemore 464 Commonwealth Ave	4 00	7 00
Brunswick Boylston and Clarendon Sts	3 50	5 00
Buckminster 645 Beacon St	3 00	4 00
Canterbury 14 Ch rlesgate West	4 00	5 00
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LIMITED ATTENDANCE-ADVANCE REGISTRATION

Attendance at the Boston se sion will be limited to a number that can be comfortal ly accommo dated at the climics the limit i attendance being based upon the result of a sur a softhe amphitheaters operating room and laboratorics in the

hospitals and medical schools as to their capacity for accommodating visitors. Under this plan it will be necessary for those who wish to attend to register in advance.

Attendance at clinics and demonstrations will be controlled by merus of special clinic tackets which plan has proved an efficient means of providing for the distribution of visiting surreons among the several clinics and insures against over crowding the number of tickets issued for any clinic being limited to the capacity of the room assigned to that clinic.

RI GISTRATION FUL

A registration fee of \$5,00 is required of each surgeon attending the annual Clinical Congress such fee providing the funds with which to meet the expenses of the meetin. To each surgen registering in advance a formal receipt for the registration fee is issued which receipt is to be exchanged for a general admission eard upon his existration at headquarters. This card which is nontransferable must be presented to secure clinic tackets and admission to the evening meetings.

PRELIMINARY PROGRAM FOR EVENING MEETINGS

Presidential Meeting Monday October 8-Symphony Hall 8 15 P M

Address of Welcome Frederic J Cotton M D Boston Churman of Committee on Arrangements Address of Retinne President George David Stewart M D New York

Introduction of Foreign Guests

Inaugural Address Franklin H Martin M D Chicago

The John B Murphy Oration in Surgery Mahgnant Bone Tumors Professor Vittorio Putti Bologna Italy

Tuesday October 9-Ballroom Copley Pla a Hotel 8 15 P M

Hunterian Oration SIR Squire Sprigge M.D. B.Ch. F.R.C.S. London

Symposium Ureteral Transplantation

ROBERT C COFFEY M D Fortland Oregon Transplantation of Ureters into the Large Bowel Arthur H Curtis M D Chicago

CHARLES H MAYO M D Rochester Minn Contributing Causes of Genito Uninary Anomalies
Discussion George Gilbert Smith M D and William Carter Quinby M D Boston

Il ednesday October 10-Ballroom Copley Pla a Hotel 8 30 P M

Special Meeting of the Bo ton Surgical Society The Presentation of the Henry J Bigelow Medal to Chen viter Jackson M D Philadelphia

Thursday October 11-Ballroom Copley Pla a Hotel 8 15 P M

I ROFESSOR ARCHIBALD YOUNG MB CM FRFPS Glasgow Sacro Coccygeal Chordoma

GEORGE W HOLMES M.D. Boston Results of X ray Treatment in Cases of Cancer of the Breast

SIR CHARLES BALLANCE K C M G C B M V O London The International Cancer Conference British Empire Cancer Campaign

GEORGE W CRILE M D Cleveland The Adrenal Factor in Hyperthyroidism

COLONEL SIR JOHN LAWN THOMAS KBE CMG CB FRCS Llechryd Wales Motion pictures on orthopedic subjects with introductory remarks

Con ocation Friday October 1 -Symphony Hall & 1, PM

Conferring of Honorary Fellowships

Presentation of Candidates for Fellowship

I residential Address FRINKLIN H MARTIN M.D. Chicago

Fellowship Address William J Mayo M D Rochester Minn

PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY GYNECOLOGY OBSTETRICS UPOLOGY ORTHOPEDICS

MASSACHUSETTS GENERAL HOSPITAL

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E M DALAND-4 30 Pl tic surg ry

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PETER BENT BRIGHAM HOSPITAL

Monday

HARVEY CUSHING—2 30 Neurosurgical clinic Francis Newton—3 30 Diverticulitis

CHANNING FROTHINGHAM-4 Passing of the chronic ap pendix
E S EMER JR -4 30 Study of the results of medical

and surgical treatment of peptic ulcer

Tuesday

Staff-9 30 Surgical operations

H A CHRISTIAN-2 30 Medical diagnostic and thera peutic clinic

GILBERT HORRAX—3 30 Cordotomy for the relief of pain J P O HARE—4 Hypertension and nephritis in relation to surgery

DAVID CHEEVER-4 30 Surgical diagnostic clinic

Wednesday

Staff-9 30 Surgical operations M C Sosman-2 30 \ ray study of massive atelectasis of the lung

G P GRABFIELD-3 Effect of drugs on the nitrogen metabolism

JOHN HOMANS—3 30 Treatment of varicose ulcer S A Levent—4 Heart disease in surgery S B WOLBACH—4 30 Demonstration in surgical pathol

Tl ursday

Staff—9 30 Surgical operations
W C QUINIV—3 30 Surgical clinic
R H I ITZ—3 Insulin in surgical conditions
WILLIAM MURPHY and JOHN POWERS—3 30 Treatment

of secondary anæmia by liver diet HARVEY CUSHING and TRACY PUTNAM-4 Pituitary gland

and its influence on growth

CHILDREN'S HOSPITAL

Monday

R. B OSGOOD W E LADD and associates- Fracture conference combined surgical and orthopedic services

Tuesday

Surgical staff-9 General surgical operations followed by dry clinic

WILLIAM E LADD Hare lip and cleft palate

C G MIXTER Contractures and plastics H W Hupson Angiomata

G D CUTLER and KENNETH BLACKFAN Medical aspects of empycma and lung abscess
Orthopedic staff— Dry clinic infantile paralysis
W L Aycock and E H Luther Epidemiology occur

rence scrum treatment S M FITCHET Demonstration of apparatus for prevention

of deformity in early cases

MISS MERRILL, Muscle training FRANK OBER Tendon transplantation

E W RYERSON (Chicago) and A T Legg Stabilizing operations

A T LEGG Operations Frank Ober Moving pictures

II ednesday

W E LADD R B OSGOOD and associates-9 Combined clinic of surgical and orthopedic services present policies in the treatment of glandular intra abdomi nal bone and joint tuberculosis

R B OSCOOD W E LADD and associates-2 Combined clinic of surgical and orthopedic services ostcomy elitis acute chronic circumscribed Brodie's abscess septic joints types of infection and treatment

Thursday

Orthopedic staff-9 Dry clinic ALFRED TAYLOR (New York) and J W SEVER Confer ence on obstetrical paralysi with lantern slides and moving pictures

TREEMAN ALLEN F SMITH (New York) W B CANNON and A H BREWSTER Conference on spastic pal v BRONSON CROTHERS and MISS TRAINOR Muscle trainin

A H Brewster Stoeffel operation
Surgical staff—2 General surgical operations followed by

dry clinic
C G MINTER Uninary obstruction and infection
W E LADD Kidney stone

THOMAS LANMAN Hermia and unde cended testicle C G MIXTER and S B WOLBACH Kidney tumors pathological aspects

Friday

Surgical staff-q General surgical operations followed by dry clinic

WILLIAM E LADD Pylone stenosis
G D CUTLER Idiopathic peritonitis AUGUSTUS THORNOIKE Appendicitis

C G MIXTER Intussusception WILLIAM E LADD Obliteration of bile ducts

Orthopedic staff-2 Dry clinic ELLIOTT G BRACKETT (Cincinnati) and H J FITZSIMMON

Conference on torticollis followed by operation F D Dickson (Kansas City) and R Soutter Conference on congenital di location of hip followed by clo ed reduction and shelf operation

FREE HOSPITAL FOR WOMEN

Monday

W P GRAVES and DR SMITH-2 Dry clinic Gynecol ical pathology demonstration of specimens and lides

Tuesday

W P GRAVES FRANK A PEMBERTON and R G WADS worm - Gynecolo ical operations Amputation of cervix and coeliotomy (first stage procidentia) permeorrhaphy (second stage procidentia) hysterec tomy for fibroid dilatation and curetta e collotomy for retroversion

Wednesday

W P Graves Frank A PEMBERTON and E B SHEEDAN Gynecological operations Plastic and coeliotomy (reconstruction operation) hysterectomy for fbr id dilatation and curettage colliotomy for retro si n permeorrhaphy for complete laceration of permeum

Thursday

W P Graves Frank A Pemberton and Dr Suith-o Gynecological operations Amput to n of cervix and coclictomy for procidentia plastic and coclictomy for prolapse (reconstruction operation) hysterectomy for fibroid closure of vesicovag nal fistula

Friday

W P Graves Frank A Peuberton and Dr Smith-9 Gynecological operations Hysterectomy f r cancer dilatation and curettage and application of radium for cancer Dry chine Demonstration of can er cases treated

BOSTON CITY HOSLITAL

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HARVARD MEDICAL SCHOOL

Monday

DRS GAMBLE and KEEVER-2 Acid base factors in pylone and duodenal obstruction in children DRS WOLBACH and BLACKFAN-2 Hamatological studies

with special reference to splenectomy in children BRONSON CROTHERS-2 Studies of injuries to the spinal cord in infants

W L Moss and DR ELEY Studies concerning blood transfusion

LLOYD D FELTON-2 Pneumococcus antibody solution methods and uses

W LLOYD AVCOCK and E H LUTHER - Infantile paraly sis modes of spread use of convalescent serum ex periments in immunity and epidemiology of the disease

M J ROSENAU and H B ANDERVENT-2 Filterable viruses experiments on encephalitis lerges and ac cine virus

W B CANNON-2 Complete denervation of heart eff ets of total sympathectomy

ALEX FORBES and HALLOWELL DAVIS-2 Demonstra tion in laboratory electrical methods for analyzing functions of nerve tissue

The new electrophysiology center will be open for inspection to any who are interested in the physiology of the nervous system

Tucsday

DRS GAMBLE and KEEVER-Acid base factors in pyloric and duodenal obstruction in children Drs Wolbach and Blackfix—2 Hæmatological studies with special reference to splenectomy in children

BRONSON CROTHERS- Studies of injuries to the spinal cord in infants

W L Moss and DR ELEY-2 Studies concerning blood tran fu ion

L W SMITH—2 Pathology of the thyroid gland C L CONOR—2 The behavior of certain tumors of fowls when transplanted to bone studies in carotin its occurrence its preparation in pure forms results

of injection and feeding experiments
HENRY PINKERTON— The behavior of oils and fats in the luras the pathology of the splenomegalics in childhood

SHIELDS WARREN- Ti e prevention of peritoneal adhe sions ly amniotie fluid experimental and elimical result

M J Schlesinger-2 The effects of hamatoporphynn on animal

Drs Wolbach and Howe-2 The pathology of the deficiency disea es with sp cial reference to scorbutus rachitis and vitamin A deficiency (verophthalmia)

Wedresday

LLOYD D Incidence I neumococcus antibody solution methods and uses

W LLOYD ALCOCK and E H LUTHER Infantile paralysis modes of spread the use of convalescent serum experiments in immunity and epidemiology of the disease

J W Schereschewsky-2 Cancer the use of high frequency cu ents

M J ROSENAU and H B ANDERVENT Filterable viruses experiments on enc phalitis herpes and vaccine virus W B CANNON-2 Complete denervation of the heart effects of otal sympathectomy

ALEX FORBES and HALLOWELL DAVIS D monstration in laboratory electrical methods for analyzing the functions of nerve tissue

PHILIP DRIVER- New methods of artificial respiration CECIL K DRINKER and STEPHEN WINT-2 New colloid solutions for intrav nous inj ctions as substitutes for simple salt solutions Louis A Shaw - Experiments on the exchange of gases

through normal tissues STANLEY COBB-2 Microscopic demonstration of capillar

injection of the brain II S FORBES-2 Demonstration of the cerebral circu

Thursday

L W SMITH- Pathology of the thyroid gland

lation in living cats

C L CONNOR- The behavior of certain tumors of fowl when transplanted to bone studies on carotin it occurrence its preparation in pure form re ults of injection and feeding experiments

HENRY PINKERTON—2 The behavior of oils and fats in

the lungs the pathology of the splenomegalies in childhood.

SHIELDS WARREN-2 Prevention of peritoncal adhesions by amniotic fluid experimental and clinical results

M J SCHLESINGER-2 The effects of hamatoporphyrin on animals

DRS WOLBACH and HOWE-2 The pathology of the de ficiency disea s with special reference to scorbutus rachtis and vitamin A deficiency (verophthalmia)

EDWIN J COHN- The interaction between prot ins and electrolytes or the more special problem concerned with the nature of the material in liver effective in

pernicious anamia
per Cors Microscopic demonstration of capil STANIEY CORBlary injection of the brain

H S FORBES-2 Demonstration of the ecrebral circula tion in living cats

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Conferences in general surg ry orthopedics genito urmary surgery gynecology and obstetiles from 9 to 1

THORNDIKE MEMORIAL-BOSTON CITY HOSPITAL Tresday a d Thursday 2 30

George R Mr.or Treatment of permissions anomia DRS MINOT WEARN and others Lpilepsy capillary cir culation achyliag strica anamia and di orders of the blood cardiovascular disea es metaboli in bacte hology

R P STRONG Demonstration of certain tumors of para sitic on an

G C SHATTUCK Lecture on tropical diseases of surgical

SURGICAL LABORATORY -MASSACHU ETTS GENERAL MOSPITAL

Tuesday a) d Tl ursday

M A McIver Experimental pr blems in connection with intestinal ob truction

C Wni E Subject to be announced

R H SMITHWICK Circulatory disorders of the extrem ities

MASS ACHUSETTS GENERAL HOSPITAL

Hed day o

1 V Bock. Study s on the physiology of muscular wo k in health and disease

J C Aun Inve t gations in calcium metabolism bearing on bon growth and r pair

W O Thompson, Studies on thyroid diea e noline dosage in exophthalmie gotter thyroxin in my vordema

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ST ELIZABETH S HOSPITAL

Tuesday

G F KEENAN-0 Surrical clinic Appendect my hys terectomy

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Genito urinary cases end results and unu ual n t

genorrams T J SCANTAN— Gynecolo ical examinati n
Pierce Dunphi—2 Ca es of cancer of cervi op rati n

and \ ray therapy one to f ur years aft r operat n
PIERCE McGan Postoperative hyp spad a Hed sd v F T INTZEN-9 Surgical clinic Appendect m clo-

lecystectomy G F KEPAN—9 Sure calclinic Cholecystect m
Pierce Dunhit—9 Penneal plastic con r an -cti n
Joseph Synton—9 Thyr id cases
R Sullinn—9 Knee cartila e

T F BRODERICK-9 Reconstruction of hip plastic n

knee joint T F BRODERICK and R F SULLIN .-End results in spinal fusion for tuberculosi c li and anatomical anomalies end results in pl ti ca

for rehel of def rmity F T Jantzen-2 End re ults in fractures operat e nd non-operative collo dal lead treatment f r mais nant

diseases DR HEALEY-Interesting roent enograms

TORN DUNPHY-Sur ical aspects of ped atrics

Tin sday T F BRODEFICK—9 Sur ical clime Spinal f si n A L Chute—9 Prostatectomy turn r of bladde

nephrectomy JOSEPH STANTO Gastro-enterestomy ch l cyst c tomy appendent my

II S Rowel—9 Hysterectomy
G F Keelal—9 Ovarian cyst
A H Crosbre—9 Neph ectomy

JOSEPH STATOS - Dry clinic II ut "la s st mach fib oma of colon with intermittent into u pti n

carcin ma of appendix

J J SULLYAN— Toxemia following admin trati n f alkalies for treatment of duodenal ulc r

L J Louis— Postop rative pancreatic cy t
H S Rowen—2 Surg cal cales

Friday

L J Louis-9 Surrical clin c Appendectomy chol cystectomy

H S Rowen-9 Cholecystectomy JOSEPH STANTON-9 Appendectomy hysterect my

G F KEENN—9 Ventral hernia appendect mv C J KICKHAM—9 Cos rean section F T JANIZEN—9 Inguinal hernia under loc 1 næsthesia G F KEENAN-2 Dry clinic Po toperate f cture of

skull postoperative extensive rection fichest
M. H. Spellman— End results in fractures of skull

TUFTS COLLEGE MEDICAL SCHOOL

TIMOTHS LEARY- daily Demonstrati n of specimens illustrating results of traumatism especially cran I and cerebral

LONG ISLAND HOSPITAL

Monday

J H CUNNINGHAM and C S SWAN- Genito uninary clinic operations and demonstration of ca es CHARLES LIND- The n e of surgical diathermy in can cer of the tongue and mouth

LAWRENCE W SMITH- Surgical pathology H R. Viers- Neurosurgical features pertaining to sur

N B MacMillan Survical X ray demonstration

Wedn sdav ROBERT SOUTTER-2 Orthopedic clinic operations and

demonstration of cases traction in the treatment of fractures treatment of concenital hip I AWRENCE SWITH- Surgical pathology

II R VIETS- \eurosurgical features pertaining to sur

SCI V. B. MacMillan — Surgical \ ray demonstration Charles I CD — Injection treatment of varico e veins operations and demonstration of cases

Friday

J H CUNNINGHAM and C S SWAN- Genito-urinary operations

ROBERT SOUTTER-2 Orthopedic operations
CHARLES LUND General surrical operations 1 AWRENCE SMITH-2 Surgical patholomy II R \ rers—\ \eurosurgical features pertaining to sur

N B VIACMILLAN—2 Surgical N ray demonstration

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

Tu sday

L D ADAMS B L ATMOOD and GRACE ROCHFORD-0 Gynecolo ical operations

B L ATWOOD E MICHAERITON MARION VITE-9

Cas rean section operative deliveries if available Il ednesday

MARION NOTE-9 Demonstration of unusual obstetr cal ca s nurser, and wa d walk prenatal clinic

I D Adays B L Atwood and Grace Rochford—o

The raday

t RACE ROCHFORN and OLGA LEARY-9 Dem n tration of po toperative ca es pathological specimens EVELIVE B LYLF and I WRIGHT-9 Demonstration of border line cases

BETH ISRAEL HOSPITAL

WYMAN WHITTEMORE and associates-9 daily General sur ical clinic

F G CRABTREE—9 daily Urolomical clinic
MARK ROCER —9 daily Orthopedic clinic
HERMAN BLUNGARD Demonstration in medical research

Gynecol meal operations

department

BOSTON UNIVERSITY SCHOOL OF MEDICINE (Evans Memorial Buildin...)

S R MEAKER and 1 W Rowe-2 Wednesday and

Finday Studies not rility
W Rove and C H Lywrence— Wednesday and I'nday Endocrinology

SURGERY OF THE EYE EAR NOSE AND THROAT

CLINICAL DEMONSTRATIONS

7 sd x P V -Ge e x Roo x Statl Hot l

I M WHEELER M D Ne Yo L a d Grorge S DERBY M D Boston O M stak s 1 Ophthal molocy

C B FALACT M D Boston Br th ces C ses Lipiodol Inj ctions in Br in this

H I CHII MD Bost n R pot of a Case of C b llar Abs ss D C SMATH MD B ston Lip of II 1 ton in Lung Abscess

E W HERMAN M D Bo ton I to Cas s of I or gn Body in the Tracheo Chophag W II

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Thursday

Otolaryngolo y

V H KAZANJIAN-9 Plastic operations D C Smyrif-9 Dry clinic Fluoroscope and emo al f metallic forei n bodies

H P Mosurp-10 Dry clinic Γyhibiti n of ces pha in truments demonstration of fluoroscopic tion of the esopha us

\ S MacMillan-11 Dry clinic Lantern slid dem n stration of resophageal cases

Dr I ii by — Demonstration of B rany test I Γ (NRLAND—3 Dry clinic Infection of the subma. il lary gland

Ophthalmology

Staff-q Operations and demonstrations of cases

I B Hollow W Thyr id Sc cases

A Greenwood Lie operations S J Beven Refraction with an ular type

W B LANCASTER Muscles
H B C RIEMET External diseases
F B DUNTHY Permetry

II K MESSENGER I hysiolo ic optics
P \ CHAYDLER Light sense
T I TEFFY Pathology
IDY E I IDDEWAY Sight saving class

Friday

Ophthalmology

Staff-o Operations and d m astrations of cases

I II VERHOLIT Ey ope ations
H B C RIEMER Tear sac cases conmental acute chronic

AMA SMITH Social w rk If K MLS ENGER Physic logic opties P A CHANDLER Li ht sense

T L TERRY Patholo v

ID \ E RIDGEN 11 S ht saving class

Otolary noology V II KAZANJIAN-9 Dry class C rection of def r mities of the face and nose lantern slide demon t

tion

II P Mositer— o Dry clinic Punch tr cheotomy
A S MACMILLAN Tray of thymus (lantern sl d s)
I L GARLAND—II Historical exhibit of laryn eal nstru ments

II P Cuttle-2 Dry chnic Lantern slide demonstrat n f senal sections of the ear

D H WALKER-3 Dry clinic Lip readin and the deaf child

CARNEY HOSLITAL

T esday

W S LIEBUN-9 Lye ope ations and dem astration of cases \ tay localizati n and ma net e traction of forer n bodies

Il ednesday

I D HURLEY and W S LIEBUAN-9 I've operat us } and demonstration of case

Thursday

nd demonstration f cases

W J Singer wand I G Vit iter— Otolaryn ol g cal graduate teaching of lary i gy clinic

MASSACHUSETTS HOMEOPATHIC HOSPITAL

Tuesday

W D ROWLAND-9 Fye ch ic F W COLBERY and H 1 BARCOCK-9 Aural clinic

Tl rsday

W D ROWLAND-9 Eye clinic C Smith C W Bush I P Johnson P O Parri 221

W W MAKER-9 Nose and throat clinic

Triday IN D ROWLAND J F STERNBERG H M EMM > a 1 I I SI IPBALL-Q I ve clinic

HAPAAPD MEDICAL SCHOOL

Mo iday

H P Mosner - Laryn olo ical demonstration Cast of the adult œsophagus wet specim as showing th ces phagus at birth cadaver dem nstrati n of th Mosher To 1 lachrymal sac operati n teachin meth ods used in p st aduate instruction in laryn of 3

Tuesday

G S DERBY- Ophthalmolo ical demonstrations \c tive earch d m nstrations of what the path 1 meal Station of work on the 1 ht sense teaching of phy io lo c optics

DRS VERHOEFF and TERRY Dem nst ation of patholo ical slides

DRS DERBY CHANDLER and MISS O BRIEN St nifcance of the li ht sen and a dem nstrati n f the m th d by which it may be t sted

Ophthalmic er o raph vrites aut LUCIEN HOWEmatically the story of ocular fatt ue and r latt n of

this fati ue to ye strain

H P Mosier-2 Mosher Toti lachry mal sae ope ti n demonstrati n on cada er

P Γ MELTZER Anaton ical exhibit of t mporal 1 n so cunens

W d sday

H P Moster- Laryn olo cald monstration Ca ts of the adult esopha us vet specimens showing th cesopha us at bi th cada er demonstrati n f the Mo her Toti lachry mal sac operation teaching methods used in post grad ate instruct n in 1 ryn olo y C B TAUNCE— E hibition of temporal lone pecimen

Ti sday

G S DERBY- Ophti almolo ical dem n trations \c ti e re ca ch d monstrati ns of what the patholo ical laborat ry 1 doing and has d ne in the past dem n stration of work on the li ht sense teaching of phy 10 I ic opt cs

DRS VERHOEFF and TERRY Demonstration of patholo 1 cal sl des

DRS DERBY CHANDLER and MISS O BRIEN St nife ce of the li ht sense and a demonstration of the method by which it may be to ted

W S I IEBMAN a d II BORNCHOFF-O De op rations I LUCIEN HOWE-2 Ophth lmic ergograph writes aut matically the st ry of cular fatigue and relation of

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BOSTON DISPENSARY

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II J INGLIS-2 Beck Schenk snare meth d f t s I l ct my

II d day

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ST ELIZABETH'S HOSPITAL

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W T HALLY-q Mastod dt 1 es Tid d

P S McAdams-9 Enucl t fth)
J Burns-9 T flect my

Fdv

W T H. LEY-0 F tal J Bur s-9 M t d p at W T HALEY- E d lt

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NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

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BETH ISRAEL HOSPITAL

L \ I IEDMAN a d L AREN-9 daly No e d th t

BOSTON CITY HOSPITM I I CORBETT-o d by Tv 1 nic

CARNEL HOSPITAL I D HURLEY-0 d by ly cl

ANNUAL HOSPITAL STANDARDIZATION CONFERENCE

Monday 10 00-Ballroom Copley Pla a Hotel

GEORGE D STEWART M D New York Presiding Address of Welcome FREDERIC A WASHBURN M D Boston Director Massachusetts General Hospital

The Rôle of the American College of Surgeons in Improving Hospital Service George D STEWART M D New York President American College of Surgeons

Presentation of Annual Report of Hospital Standardization and Announcement of Approved List for 1928
M T MACEACHERN MD Chicago Associate Director American College of Surgeons and Director of Hospital Activities

Health Inventoriums in Approved Hospitals—Further Progress of Research Franklin H Martin M D Chicago Director General American College of Sur

The Interest and Influence of the Duke Endowment in

Hospital Standardization W S RANKIN M D Charlotte N C Director The Duke Endowment Nurses Patients and Pocketbooks May Ayres Burgess

Ph D New York Director Committee on the Grad ing of Nu sing Schools

General Discussion WILLIAM DARRACH M D New York Dean College of Physicians and Surgeons Columbia University and MARY M ROBERTS R N New York Editor American Journal of Nursing

Monday 00-Ballroom Copley Pla a Hotel

GEORGE D STEWART M D New York Presidin, Missed Pedago ic Opportunities Incident to the Usual Organ zation of the Resident Medical Staff of the Hospital HENRY A CHRISTIAN M D Hersey Professor Theory and Practice of Physic Harvard University Medical School

Medical Education and Specialization WILLARD C RAPPLEYE M D New Haven Director of Study Commission on Medical Education

Experimental Science versus Imitative Art in Medicine MURRAY BLAIR M D Vancouver B C

What Is the Rôle of the Hospital Administrator? F E CHAPMAN Cleveland D rector Mt Sinai Hospital Visual Methods in Conducting the Staff Confe ence (Illus trated) C G PARNALL M D Rochester N Y Director Rochester General Hospital President elect American Ho pital Association and HARRY D CLOUGH M D Rochester N 1 Assistant Medical

Director Rochester General Hospital General Discussion CHARLES H YOUNG M D Portland Maine Director Maine General Hospital and Jone T Burrus M D High Point N C Surgeon Hi h

Point Hospital

Tuesday o 30-Ballroom Copley Pla a Hotel

JOSEPH B HOWLAND M D Boston Superintendent Peter Bent Brigham Hospital Presiding

The Educational and Leonomic Value of the Outpatient Department in a General Hospital James Raglan Miller M D Hartford Assistant Gynecologist and Obstetrician Hartford Hospital

Selecti e Economic Basis for Outpatient Service (Illus trated) BEATRICE LAISER Detroit Clinic Executive

Harper Hospital

Minimum Standards for the Hospital Social Service De partment Mabel R Wilson R N Boston Director Social Service Department Children's Hospital

The Operation of a Physical Therapy Department from the Scientific and Economic Standpoints John S Coulter M.D. Chica o Assistant Professor of Physical Therapy Northwestern University Medical School

MICHAEL M DAVIS Ph D New York Discussion Executive Secretary Committee on Dispensary De velopment United Hospital Fund of New York and FRANK GRANGER M D Boston Director of Physical Therapy Department Boston City Hospital

Tuesday 00-Ballroom Copley Pla a Hotel

Clinic on Case Records in Hospital Directed by C W MUNGER M.D. Valhalla N.Y. Director Grasslands Hospital

What Constitutes a Good Case Record? ERNEST LEROT HUNT M D Worcester Surgeon and Director of Surgical Services Worcester City Hospital

What Are the Best Methods of Appraising Case Records? HAROLD W HERSEY M D' Bridseport Superin tendent Bridgeport Hospital

What Part Should the Record Librarian Play in Promoting Efficient Case Records in the Hospital? Grace W. Myers Boston Librarian Emeritus Massachusetts General Hospital

How Best Can Good Case Records Be Maintained in the Small Hospital Where the Usual Difficulties-Lack of Internes Shorta e of Funds and No Historian or Record Librarian-Are Frequently Found? CLARA A DOOLITTLE De by C nn Hist rian Griffin Hospital and President Connecticut Hospital His torians Association

What Are the Most Effective Ways and Means of Stimulat ing Good Case Record ? THIMA C BLACK New Haven Record Librarian Grace Hospital

What Should Be the Functions of a Record Committee of the Medical Staff? E. W. WILLIAMSON M.D. Chicago. Chief Field Representative American College of Surgeons

What Are the Most Effective Means of keeping Current Case Records up to Date? R C BUERKY M D Madison Superintendent Wisconsin General Hospital What Are the Relati e Advantages or Disadvantages of the Various Filing Systems? EDITH M ROBBINS Boston

Chiel Record Librarian Peter Bent Brigham Hospital The Organization and Functioning of a Central Record
Department Genevieve Chase Boston Record
Lib arian Massachusetts General Hospital

Wednesday o 30-Ballroom Copley Pla a Hot 1

Open Forum-Problems Involved in the Pr fess onal Care of the Patient D rected by Lewis \ Sexton M D Hartford Superintendent Hartford H spital

Measuring the Pr fess onal Efficie cy of the Hospital JOSEPH C DOANE M D Phil delphia Superintend ent Philadelph a Gene al H spital

Standard of Surgical Efficiency George W Swift M D Seattle Surgeon Children's Orthopedic and King County Hospitals

Medical Staff Organization T T MURRAY Albany Superintendent Mem ial Hospital

Relation of the Clinical Pathologist to the Medical Staff and the Scientific Work of the Hospital J J Moori M D Chicago Director National I athological I ab oratory

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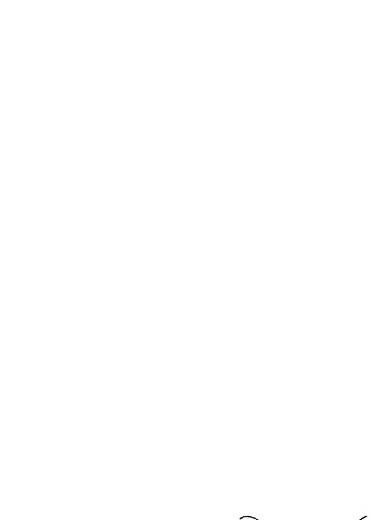
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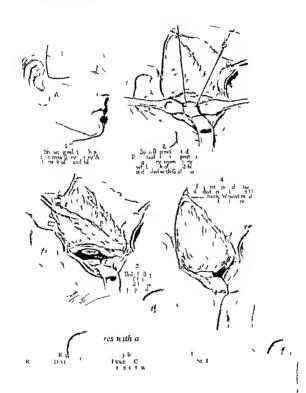
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LUKENS PICTORIAL TECHNIQUE BONE IND JOINT SERIES F NETHEROL ST. OF FAN



SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED MONTHLY

VOLUME \LVII

OCTORER 1928

NUMBER 4

THE ETIOLOGY OF PULMONARY ABSCESS¹

BY MINAS JOANNIDES M D CHICAGO ty of Ill is Clig f M d Fmth Dptm tfS gry U

ULMONARY abscess may be defined as a localized necrosis and liquefaction within the parenchyma of the lung due to infection. This suppuration may have its origin either in the lung parenchyma in the bronchial tree or by extension from an adja cent suppurative process. The abscess may be associated with or may be the result of pneumonia and other diseases of the lung it may be secondary to aspiration of infected materials into the lung or it may be the result of infarct secondary to infected pulmonary embolus It may result also from injuries to the chest and intrathoracic organs from blunt trauma bullet wounds stab wounds or from an extension of infection through the dia phragm

HISTORICAL

Our earliest written records of pulmonary abscess are to be found in the works of Hip pourates (17) who recognized abscess of the lung as such and considered aspiration of blood and mucus as the cause of the disease He taught that a pulmonary abscess that had burst into the pleural cavity could be healed by draining the latter and to that end he de scribed a method of thoracotomy From the time of Hippocrates in the fourth century B C no written records appeared on pulmonary suppuration until 1584 1 D when Schenk (38) called attention to this condition He is cred ited with a case in which he promoted spon

taneous rupture by fomentations Baglivi (3) in 1696 is said to have established drainage by intercostal incision Other early workers in this field were Barry Campardon Sharpe and Pouteau In 1793 Gumprecht (12) pub lished a monograph on the diagnosis prog nosis and treatment of pulmonary abscess He states that before surgical treatment is in stituted it is necessary to determine the pres ence and seat of pus and the condition of the

pleura as to adhesions

J B Murphy (28) classifies the various etiological factors under 9 separate headings as follows (1) acute circumscribed influmma tion as pneumonia followed by necrosis and softening of the lung (46 per cent) (2) peri bronchitis (3) septic embolism of the pul monary artery or a single branch of the bron chial (4) rapid tuberculous caseation and necrosis with secondary infection (5) perfora tion of the lung by infection from malignant diseases of the ecsophagus and mediastinum (6) subphrenic perforations into the lung with retention (7) foreign bodies in the bronchi (8) infections following injuries and (9) sup purative inflammation around calcareous de posits the latter either a sequence or a cause of the suppuration In his classification Mur phy makes no mention of aspiration of infected material other than foreign bodies. More recent studies bear out the original Hippocratic theory that aspiration of infected blood is of great importance as a cause of abscess

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Clastor (5) in 1916 reported 4 cr es with recovery. In a study of 7 cases Lord (6) found that in 78 cise the ethological factor was an operation about the upper respirator, tract and in 49 per cent of these class the operation was a tonsilication. On the basi of the e statt tics he stated. On the whole the impression is that larger s of infected material from above into the deeper parts is regarded as the chief cau e of pulmonary is ce.

Heidlom (1) states Aspiration of in tected material appears to be a more frequent cause of above than 1 gen falls recognized (it con iderable interest and importance are the apparently relatively frequent lung abovese following tonsillectomy

Lemon (4) carried out a senes of experiments to study 4 different factors relative to pulmonary aspiration namely (1) to learn whether or nrt aspiration does occur when the animal is investhetized (2) to discover some of the factors nece ary to permit aspiration (3) to evaluate the recidents that may occur durin, in istlies it and their relationship to aspiration and (4) to learn the result of ether masthe ia on some of the recognized protective mechanisms of the lung. The results of in experiments are is follows (7) when the dog under an esthesia lie on a plane inclined it various degrees aspiration occurs regard

less of whether the arresthesia is light or deep No aspiration occurred in non arresthetized dogs. (2) The position of the head relative to the body seems to make little if any difference in the amount of miterial aspirated (3) When there is a relatively large amount of fluid material aspiration by suction pumpfuls to prevent the downward course into the lung (4) In almost excry instruce the fluid preceded the particulate mitter. (5) When the head of the animal was 28.75 centimeters lower than the feet aspiration did not occur

In the di cussion of Lemon's paper. Hed blom (14) called attention to the fact that pulmonary infection in man following aspiration must depend largely upon the nature or the virulence of the infective organisms of both. This experimental work he continue

certainly seems significant as supporting the view that most of the cases of pulmonary suppuration that follow nose and throat op erations are due to aspiration of infected material. At that time the hope was expressed by Hedblom that investigations be pursued in the direction of determining the role that different types of infection may play in the production of pulmonary lesions.

Myer on (a) in a broncho copic study of 100 cases undergoing tonsillectomy under light ceneral an esthesia found that the abolition of the cough reflex is of creat importance in aspiration. In 75 cases the cough reflex was ibolished and in 7 of the e cases he noticed blood and mucus below the larvay. In 2 out of the 100 cases the cough reflex was not abol ished In only 4 of this number did he notice blood and mucu below the larvny We agree with Wyerson (30) that the fulure to expel aspirated material is more important than the aspiration itself. By keeping this factor in mind and causing the infected blood to be entrapped in the alveoli we were able to pro duce absee ses in over 70 per cent of our do,

That the aspirated blood reache the alveol very readily is proved also by the work of Corper (6) He observed that under ether anasthesia aspiration of fluids after instillation into the nose occurred readily in dogs and rabbits placed in the horizontal position. In the non anresthetized animal lying, in a horizontal position however repetited inval

instillations did not cause aspiration. On the other hand with the non anasthetized ani mals in the vertical posture the aspiration of fluids was easily attained in rabbits but less so in dogs the fluid being found mainly in the lower lobes Corper also found that particu late matter such as carbon particles are found heaped up at the points of bifurcation of the ur passages with relatively little being re t uned in the alveoli. In another series of ex periments he traced the aspirated fresh blood to the alveoli of rabbits as late as 4 weeks ifter the intratracheal injection. At the site of the blood localization the presence of a distinctly palpable induration was noticed. This was due to a proliferative pneumonitis occa sioned by the presence of blood in the finer pulmonary subdivisions. This induration was found to persist longer than 4 weeks

Herb (16) made an extensive study of the cifects of anesthesia on the lungs. She states that ordinarily ether is not any more likely to produce lung complications than a local in sthetic especially if the other is adminis tered properly. She condemns the use of the closed mask and quotes the work of Dresser (11) who found that the ether vapor within the closed mask sometimes reached a concen tration as high as 34 per cent while 6 or 7 per cent is the strongest concentration which may be inhaled without irritation to the air pas In addition to aspiration other fac tors important in the production of lung complications are weak heart action low blood pressure generalized sepsis cooling of the body surface diminished lung expansion caused by prin or tight bandages and mor plane which reduces the cough reflex

FUSOSPIROCHAETÆ AND FULMONARY ABSCESS

The most fruitful research in pulmonary abscess has been the study of fusospirochaete \(\) \(\) \(\) carly as 1866 Leyden and Juffe (\) were inclined to incriminate a variety of the lep tothax as the cause of pulmonary suppuration. In 1898 Withington (42) expressed his belief that bacteria may play a part in abscess formation. He quotes Babes (\) as saying

The suprophytes cannot of themselves produce gangrene but are inevitably as ociated



Pi Do 509 I o nigenogram taken 17 day after implantation of I can and showi den c shadow at site of implantation

with some other organism generally the pyo genic coccus Thus in 12 cases he found the association to be with staphylococcus in a with streptococcus and in 3 an extremely virulent pneumococcus Indeed all these cocci showed remarkable virulence. But these of themselves could only effect suppuration or necrobiosis while upon the soil thus made ready the saprophytes found a favorable con dition for growth Other concomitant mi crobes were those of diphtheria in 10 out of Thus given a receptive soil which is produced by diminished resistance in the lung tissue implantation of the saprophyte is believed to be the final stage in the production of abscess or gangrene

The recognition of spirochretal pulmonary gangrene as an entity is attributed by Maes (,) to Castellan who described the disease in 1903 Castellan (4) himself however



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tites Spinlla or spirochate have been oc casionally seen in bronchial discharge by several author (Eichorst etc.) but the parasites apparently were present in small numbers only

Pilot and Davis (35) noted that when the dental tartar is examined frish it presents bru h like processes having central strand with coccoid and fusiform bodies arranged about the terminals. In the smear they found large numbers of coarse and tine spirochet trustform bacilli of various types leptothray fulaments and gram positive streptococci of the hemolytic or viridans type. In an anaer obecculture, the fusiform bacilli produced a putril odor in the tissue media.

In the faucal tonsils Pilot and Daws (3) found these organi m in large numbers in the granular masses lain, in the crypts which in their uppearunce were lake actinomices, ranules. These bodies are found in 30 per cent of extripated tonsils and at some time reprobably present in all individuals. They appear as foul gray or yellow single or multiple granules from 1 to 6 millimeters in diameter. Iying in the depths of the mouths of the crypts from which they may be expressed Microscopically they are made up of filaments arranged in ray like structure not unlike action mony ces but certainly with no true branching.



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thread. This form a central haft about which are small comma shiped fusiform bacilliand sprochatte together with diplococci. The sprochatte are grain negative and actively motile. The cocci are chieff strepto cocci of vind insor hemoly tility to the former often anierobic in early culture. The bacilliare demonstrable in smear of culture in 80 per cent of extripated tonsils. It would seem that a process similar to that of turtar formation occurs in the ton il with the formation of spherical structures in the crypts instead of a blum.

That these organisms are pathogenic and are not normal inhibitants of the mouth wa proved by Davis and Hoto who found these organisms in putrid and grangenous lesions of the body particularly about the teeth ton sils middle ear lungs and the genitalia. They reported 57 cases of pulmonary suppuration in which the fu ospirochetre were found.

In addition to the work of Pilot and Davi we have the reports of fusospirochetal pul monary suppuration by B S kline (21) and his coworkers Pona in 1905 (36) I othwell in 1910 (37) Peters in 1911 (33) Dick in 1913 (10) and in 1918 the reports of Nolf (31) Perof (32) Thomson (40) and Weil (41) From this time on quite a large number of

reports appeared in the literature

Predisposition to fusospirochetal infection depends on many factors but as a rule the patients are weakened by other causes Local foci such as pyorrhaa or tonsils infected with fusospirochætæ are of utmost importance Pilot and Davis (35) state that the normal lungs do not harbor these organisms They could not find them in 14 pairs of lungs which were free from any infectious process. On the other hand in certain abnormal conditions such as bronchiectasis chronic bronchitis and bronchial asthma they found fusospirochæta in the sputum but the latter was not foul These organisms under such conditions ap parently lead a saprophytic life but in the presence of an acute respiratory infection or if the general resistance is lowered these saprophytic anaerobes may cause a putrid bronchitis and after spreading through the necrotic bronchial mucosa reach the lung parenchyma and produce single or multiple foci of suppuration or gangrene

Experimental production of pulmonary abscesses has been successfully carried out only recently. Cutler and his associates (9) produced embolic lung abscesses. Aspiratory lung abscesses have been produced by Smith (39) in mice guinea pigs and rabbits. Within the last year Smith's work was carried to completion by the production of experimental aspiratory abscess in dogs by Crowe and Scriff (8). Duff Allen (1) and Hedblom Joannides and Rosenthal (15). Recently Pilot (34) succeeded in producing aspiratory lungs abscesses by injecting intratracheally material containing fusospirochetæ into the lungs of rabbits and keeping the organisms down in the lung by using lipiodol

EXPERIMENTS AND RESULTS

Implantation of foreign bodies peanuts agar agar nay beans pennies. We began our experiments with this series because we felt that an implanted body would not be likely to be coughed up and would remain in the lung a sufficient length of time to cause the expected damage. We performed 14 such experiments on dogs. The substances implanted were roasted salted pennits with their inner shell



Γι" 5 Dog 2981 (above) Injection of 30 cubic centimeters of blood and abscess sputim on July 13 1927 fol lov ed by death 4 days later Dog 2986 (below) Injection of 30 cubic centimeters of blood and abscess sputim on July 13 1927 followed by death 3 days later

agar agar dry navy beans and pennies. The tech nique of implantation was a modification of the one developed for lobectomy by Joannides (19). Under aseptic conditions an intercostal incision was made Compressed air was used for the artificial respiration and sufficient pressure was exerted to allow the lung to expand moderately. An intestinal clamp with rubber tips was used to prevent air and blood leakage. With the lobe then immobile the lung was brought to the surface a small opening mide in it and the foreign body then implanted. The lung was sutured with a Gurre suture and after the release of the clamp at the hilum the chest was closed.

Before closing the chest we examined the lung wound to see if it was air and water tight. The ribs were then approximated with heavy suture and the over

lying tissues were closed in layers

In the 14 implantation experiments we were in able to produce a characteristic lung abscess but always obtained a thick walled cyst surrounding the implanted foreign body. In 3 dogs we implanted sattled roasted peanuts in 4 dogs small pieces of agar agar containing a small piece of lead so that it could be localized by the roentgen ray and in 1 dog a penny was implanted. In the 6 remaining

showed a massive gangrone with an absecss involving the right lower and mediastinal lobe. The absecss was 6 centimeters in diameter and the lung at the site of the absecss was adherent to the draphragm (Fig. 4). There, was a bilateral pleuris with harmorrhagic effusion. Smears from the absecss showed many fusiform bacilly and few spirillar gram positive diplococci and streptococci.

In another series of 3 dogs 20 cubic centimeters of the same blood were injected into the lung through the bronchoscope, and all 3 dogs died on the dividuously the injection I wo howed a missive dog (Dog 801) showed an abscess the size of a cent piece in the right lower lobe, and a mass we pneumonia in the rest of the lung. Smears from the abscess area showed bacillus fusiforms grain positive diplococcus diphtheroids micrococcus crearthals, grain negative breillus but no spiro that no function.

Intrabronchial injection of citrated tonsillectomy lload and mixed with tonsil tissue and scraping from the tetth of patients with porrhea al colaris. Six experiments were performed in this group. In each of 3 dogs we injected to eubic centimeters of 24 hour old citrated tonsillectomy blood mixed with pyor rhota scrapings and small pieces of tonsil tissue. One dog (No. 2812) died. days after the injection. At autops, this dog showed multiple abscesses in the right lung. These abscesses varied from to 5 mil limeters in diameter. A large abscess 1 centimeter in diameter was found in the upper right lobe. This area was adherent to the chest by means of fibrous

pleurss but no effusion
The second dog (No 810) died 6 days after the
injection and presented a bilateral pneumonia with
pleuriss and hamorrhagic effusion but no abscess.
The third dog (No 2800) was killed 7 weeks after
the injection No abscess could be found. Both
lungs were in state of red hepatization. Clotted
blood was found in the trachea and the larger
bronch leading to the upper left lobe.

adhesions. The bronchi were filled with thick puru

lent fluid extending into the finer ramifications. The left lung presented a massive pneumonia with

In erch of the 3 remaining dogs of this group 20 cubic centimaters of this mixtur, was used. It is striking to notice that in spite of the larger amount 5 blood used we found no abscesses in the lungs of into the same source in this entire group. The patient had had quints 2 months previous to tonsillectomy. On microscopic examination of the tonsil we found the characteristic fusospirochreit combination.

Intrabrouch it impetters of gastric contents with or without pyorth ra scrapings bits of 1 cft in 4d tonsil 1 closely blood during an it longuid op ratio. In 2 series of 5 dogs we introduced into the lung through a bronchoscope, humin gastric contents containing 52.4 free hydrochloric acid and 66.4 total acidity. One dog No 80; that received to cubic centimeters of the gastric contents on May 4 1047 was



It Dos, 3017 Intrabron I sal injection of 30 cul ic centimete of fre h dog blood and sputum from clinical pulmonary abscess Death occurred in 12 days

killed on June 1027 o days after the injection and at autopsy presented an abscess of the medias timil lobe. Of the 4 remaining dogs 1 ded 4 days after the injection and neither the lungs nor pleurishowed any pathology whatsover. Phc 3 other dogs died at 2 3 and 5 days respectively after the injection showed an extensive bilateral pneumonia and pleurishowed an extensive bilateral pneumonia and pleurish with homorrhagic effusion but presented no abscess formation. Dog 803 appeared very sick days before death. The animal was killed by means of in intracrudiac injection of colloroform and at autopsy presented an abscess the size of a nickel in the mediastinal lobe. No fluid or adhesions were found in the chest.

We tried this same experiment in a group of 3 ribbits and 3 guinea pigs. In these animals we in acted the gastine fluid through a tricheal needle. One rabbit that died 4 days after the injection of a cubic centimeter of the mixture developed an abscess of the left upper lobe. The remaining animals showed pneumonia but no abscess.

In a dogs we performed an abdominal operation while a matture of gastric contents bits of teeth pyorrheas scripings and 24 hour old tonsillectomy blood was slowly injected through a bronchoscop into the lung. In Dog 2839 we injected 15 cubic centimeters of this mattur. on May 27 19 7 and killed the dog on July 5 1927. It autopsys we found a hard mass in the right upper lobe but on sectioning we found no fluid of fortigin body in the center of this mass. The 2 other dogs were killed 1 month after the injection. In 1 dog we found no lung or plumi pathology while in the other we noticed that the lungs were speckled with small harmorrhagic treas which on sectioning showed clotted blood We alo noticed small builte in the visceral pleura but found no typical abscesses

In log v niected the dog so n freshly I tted blod aft rat as mixed with bits of t eth from a n o has p tient T enty cubic cept m t rs wer lowl 1 ject d in each of these dog h le d minal peration was being pe form d Dog 874 a I ted on lue 7 10 7 and did on lun o At auton v e found a hilateral n cum ma baces in the medi stinal lob. The other log di 1 6 i vs aft r the injetion and or ent d

lung or pl ural path logs

sperme ts t 1 to ho that gast ic on e who asperat I may cause a pulmon ry tent b b Whith ront an aldomial neating fan mp rta c 1 th pro lu tion of abs s of th lu c d pend ptir ly ur none fat r If dur g n bdom nal operation the pati t mit if th halis rai ed high r than th I lof th f t f the nasth a duing this pat ness d thittl ughan is allo ngril x sar abolish I e h ond to thit are for blito be s The thablts nof the cough r fl y my ortant in the lopm tofals sof the lung as mpr ssed upon us hen e say p t lls th muu bl d or gastre e t nts th t 1 jet d om right up nt the mouth wh a th mal s not l ply na thetized Moreo o e mal c int odu d a tooth thr ugh th one As so n as the toth we blown n t d th thuml t clos th opening f th op The threll wat ker hr n h pro ptl I thuhafore that t piec 1 th thumb d u I infct n

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iill p es f sif i d i ll il sin ll piec
f el l l t s In dog c i jeted o ubic nt m t of broth uspension f prorrher ser p is mix di th sm ll b ts of inf t d teeth Both logs r klled 38 d vs fter the injects n D g ved th injeti n n May 17 10 7 and a kill d on June o 927 \t autopsy e found mall bsc sses in the ght upper lob O s ction uded from these abscesses Dark it ld ex ami tion I the scraping sho d a large number of sp rochatæ f \in ent The sme r sho d many fu form bacill diphthero ds a digram positive d ploco ci The second dog p es nt d no lung pa thology when killed 38 days aft r the injectio

In ch f 7 d gs e injected to cubic c ntimeters of sputum from a pulmonary absc ss patient of Dr H dblom The smear of th sputum sho ed the haracte stic fusosp rochet I combination W ob tained abscess s n of th se dogs Dog 2500 re ved the nje tion on June 8 927 and di d on June o 927 At auto; sy v found a bilat ral pneum ni and an absc s of the med ast nal lobe th thin fibr nous adhe ons bet en thi lobe a d the d phragm D g 2889 r c iv d the injection on June 8 9 7 and as kill don June 9 927 At a topsy we found absces es n the left upper and right lo cr lobes The 5 r maining dog did not d velop ab cesses

In each of a dog we injected 15 cubic centimeters of abscess sputum and also implanted small pieces of fresh tonsil tissue. One dog die 1 8 days after th injection and at autonsy showed a pneumonia of both lower lobes but no ab cess The 2 other logs ere kill day and od as after the injection an lat autonsy neither showed any lung pathology

The percentag of abscess f rmation in these dogs s a tyers high be ause the souture could be easily c ughe l up as soon as th animal wok up In put of the c ugh abs s s ha e oc urred in th s ig If on the other hand we suspen led the sputum in a fluid that a uld be entrapped in the alv h th f reentag f absces s would naturally b higher Ir sh blood or freshly el tte l blood would make n ideal m dium f r such e periments because the fb noneshes a ull have a grater co be it pow rin the lung dat the same time shut off the ur upply f th part thu produ i g favor bl na rol i onditi na We tri d this procedure in our next s ri an lobtain I an unusually high

pu ntag of b ssus In the Inding two: 1 f sl f shly clotted dig ou M d r x d unt pinn form a patient with le e ab ces We in ciel this mixtur into 14 kg In so f thes animal we bituned either ingl o multipl bsc s s The ab cases varied from a f m llimet rs to a c timeters Although the low r lobes and the m diastinal lobe or most comm al ny lyed w found them allo

in the urper lob

D g 2081 r cc1 d the injection on July 13 0 7 and di d 4 da s lat r At autops, an absces the ze fas ntp e was found in the mediastinal lobe (Fg 5) Sm ars from th ab cess showed fu if rn bacilb diphther d and gram negative bacilli Th ab e s ruptured into the pleural cas ity and w I I d off by ma s of thin fibrinous dh n Both sid of the chest vere filled with thi k bloody pus. There was an acute anterior m liast nits hil the peric rdium as co red thathick bread and butter and to The lung er doughs ddd not crepitate. They see f d rk purpl c lor

Dog 982 received the injection on July 13 1927 and died a days lat At autopsy this dog presented a gangren us 1ght lo er lobe with a ruptured ab s ss the size of a silv r dollar. The c as alo a smaller abse ss a the upper left lobe. There s an reute fibrinopurulent [leurisy an l an acute an ter or med ast nitis Both sides of the chest wer filled with bloods thick pus. The left upper lob an l ight lover lobe vere adh rent to chest vall

Dog 2984 led lays after the ini ction autop y much the ame fin ling as in dogs 20%1 and o8 were notic ! The med ast allob hal mul

tipl small ab c sses

Dog 985 d d 24 h u s fter the injection addits at gangrene of the med a tinal and the lift lover lobs ther was a ruptured absces 3 by 2 centimeters in diameter. The lift lo cr lobe wa adherent to the chest wall and the diaphrigm

Dog 2086 died a days after operation. At autonsy runtured abscess in the left lower lobe was found Dog 2088 was killed 12 days after the injection and an abscess in the left lower lobe was found. Dog 080 died 8 days after the injection and presented an abscess in the mediastinal lobe This abscess involved the major portion of the mediastinal lobe and was the size of a 50 cent piece (Fig 6) contained a thick cheesy mass. There was no com munication with the bronchus The abscess had ruptured into the chest cavity. Dog 3017 ded i days after the injection and showed multiple ab scesses in the right upper lobe (Fig. 7) Dog 3019 was killed 6 days after the injection. At autonsy the lung showed multiple small abscesses in the left lower lobe Dog 30121 died 4 days after operation and presented an abscess in the mediastinal lobe Sections from the abscess wall showed characteristic polynuclear infiltration and microscopic abscesses

Dog 2988 received the injection on July 13 1927 and was killed on July 25 1927. An abscess in the left lower lobe was found. Dog 3019 was killed 6 days after the injection and at autopsy presented.

abscesses in the left lower lobe

In this series the majority of abscesses were found within the first 5 days after the injection. In a ease the dog when killed on the twelfth day presented These findings are quite in contrast with the paranasal sinus experiments. In these ex periments the abscesses were of the chronic type whereas in this last series abscesses were found as early as 4 hours after the injection. The fact that we notice multiple as well as single abscesses in these aspiratory abscesses seems to disprove the contention of certain workers who assume that multiple abscesses are generally embolic in origin. The high percentage of abscess formation in this series is un doubtedly due to the injection of freshly clotted With the formation of fibrin meshes this blood was entrapped in the alveoli and in the pres ence of the fusospirochætes formed an ideal back ground for abscess formation

Intrabronchial sujection of pure cultures of stephylococcus aureus and albus mixed with fresh dog blool. I'en dogs were injected with 10-20 and 30 cubic entimeters of the mixture. Two out of the 10 died 7 and 9 days after the injection. The rist were killed at intervals from 4 to 16 days after the injection. No abscesses were found in any of these dogs. We noticed however at various parts of the lung hard lumps / to 1 centimeter in diameter with a bard white center much like the foreign body reactions of other implantation experiments. A dissection of the bronchial tree revealed a thick stecky mucopurulent bronchits extending as far down as the smaller ramifications of the bronchial tree.

From this group of experiments we can assume with a raisonable degree of certainty that it takes more than blood and pyogenic organisms to cause pulmonary abscesses in the dog Misses such as those we found in the staphylococcus experiments have been described by Corper Kretschmer and Lune (r) Corper and his associates state that nor mal unclotted blood which has been injected intra tracheally into rabbits immediately after with drival from the internal jugilar vein is rapidly aspirited into the finer air divisions where it is retained and induces a prohiferative reaction on the part of the pulmonary tissue After all local pigment has disappeared there still remains a distinctly palpable indurition at the site of localization due to proliferative pneumonitis occasioned by the presence of blood in the finer pulmonary division.

Intraracheal supertion of blood mixed with bismuth subarbonate with the animal lying in a hori ontal position. We injected so cubic centimeters of the mixture into each of 2 dogs and studied the distribution with the X-riy. As expected the bismuth diffused itself fairly evenly throughout the whole long We can assume their fore that with the mixed tion of infected blood no part of the lung would be immune but the greater tendency for involvement would be in the portions of the lung to which the blood would naturally gravitate. This is undoubtedly the reason for the greater frequency of lower lobe or mediastinal abscesses

COMMENT

Out of a total of 87 experiments we noticed abscess formation in 21 dogs or a total of 24 per cent By using fresh blood and abscess sputum we were able to obtain abscesses in 10 out of 14 dogs or 71 4 per cent An im plantation of a foreign body infected only with ordinary progenic organisms is well tol erated in the dog s lung A saccule is formed which encapsulates the foreign body and thus makes it innocuous. Intrabronchial injection of blood plus staphy lococcus produced changes similar to those found by Corper (7) after the injection of pure sterile fresh blood. Appar ently the lung of the dog is immune to the ordinary pyogenes so that when it is injected with fresh blood we can produce only a re action characteristic of the aspiration of ster ile blood. On the other hand aspiration of either pyorrhœa scrapings or abscess sputum causes a lung abscess A broth suspension of pyorrhœa scrapings does not cause a high per centage of abscesses Our experience was the same with the aspiration of plain abscess sputum which is usually thick and tenacious and on aspiration acts very likely as a large sized foreign body It undoubtedly stays in the larger branches of the bronchial tree and is easily coughed up as soon as the animal wakes up Such is our experience also with

the appration of larger foreign bodie such a bit of teeth or pieces of the hoten if the lin not a single dog, were we sible to find sing if the efforcing bodies in pite of the most careful careful.

Knowing from the experien c of Libt in l be consider with (a) (r we in 1 Scrift (5) Duff Allen (1) and Hedblom Jeannile and Pounthal (15) that the presence the paracheter quite important in the etral as t lung above and knowing it in the work of Corper and other that I lod vill find it was into the smalle transition to the branchial tree and remain there and became In anized we can a sume that we have found both the cel in the centition to prepare the oil for uch intection. A tirition of in teeted tre h blod during or on after an peration in the na phirvity has given the highest incidence of p theretis lung ib cc e We have been able to highe ite chini cil condition by intecting tre-h blood with tre habsees putum ri han tu parachate In 14 uch experiment we have been able to bt un in le or multir le ib ce e in a a per cent ct our log In Sout of 10 lb, which level med ab e c the lean wi neute and ippeared from a to f day after the intra branchial injects n. It is very likely that the intection was o mility and o mins iron become involved that the docated promptly such we not the each wever when me r the iscrain, were i pirited Inher neh condition we found in ib ce of the right upper I be in a doc that we killed 5 day ther the injection (brome ib ee es al > hic be natiluced i are ult of a chromic per mand inquite of the full perochet ptale ul pu rich in tu itorm diphther a l by the cull be noticed in the note at our inimil In per cent of our trontal sinu experiment we fund above stringtion. In all are the above a ware tound after a prolon cliperod namely 1, (and to disifter the mu operation. There cems t be no doubt that the ru fr m the mue tound it way into the lung the eventually can me ib ce formitien

The intriduction of infected material into the lun-doc not alway produce abox so In a certain percentage of the inimal killed I to roo days after the injection no lun priphology whatever we reveiled A certain priportion of the e.do, showed a unifateral or bilateral pneumona of the lobur type. The lower lobe and the mechistimal lobe were in a frequently involved. Another group of the mid welly and gingreen of the lun, and unifly recrtain percentage showed abice soft a viring i.e. In take one hould ce all the extration is difficult to tell. It is possible that the protective mechanism in the lun, with with the different animal.

The fill wing factor are of great importance in the production of lung appuration

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The known may be in le or multiple acute crebronic. Whise been able to produce the me the ces by allowing only small immunit of pie to tred le lown trem the not of the dog, into the lund. On the other hand we have bound the cestimation within 4 he are the the injection. The able ces yield not be the testimaters to a size equal to that the confined constant.

Since abice is ruptured into the pleurid

cifu ion Usually at the site of the ab cess we found fibrinous or fibrous adhesions be tween the lung and the neighboring organ or the chest wall

In the acute abscesses a wall was not well formed but in the more chronic types we tound a wall a to , millimeters thick and the contents varied from pus to thick cheesy materral. The abscess does not necessarily communicate with the bronchus in these aspira tory experiments. In one experiment in which we obtained the largest abscess we could find no communication of the abscess with a bronchus. The wall surrounding the abscess was uniformly tough

The pneumonia that was noticed was usu illy of the lobar type. In some animals we noticed a pneumonic process in immediate neighborhood of bronchus This type of lesion was of relatively infrequent occurrence

Foreign bodies implanted in the lung in duced the development of a thick walled toreign body sac that showed no evidence of infection and that surrounded this body very intimately This lesion was produced by the implantation of peanuts beans agar agar and pennies

When blood with staphylococcus was in jected intrabronchially and the animal devel oped lesions we noticed a thick kernel like induration without a soft center. This varied in color from red to grayish vellow. On sec tion a hard cartilage like center was found

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A STUDY OF GANGLION¹

WITH ESPECIAL REFERENCE TO TREATMENT

B LOUIS CARP M D 1 A C S ND ARTHUR PURDA SIOUT M D NEW YORK

AGANGLION is a cystic swelling usually occurring in close proximity to joints and tendon sheaths and containing a thick mucinous fluid. The regions of the wrist ankle and knee and the volar regions of the tangers and hand are most frequently affected.

GENESIS

The many hypotheses dealing with the origin of gan,ha have added an interesting chapter to their study. The virtou arguments that have been advanced show that no definite conclusion regarding their geneus has as yet been reached. Even today many accept the popular belief of the middle of the last century that they are hermal protrusions of synoyial membranes or tendon sheaths. The following are brief summaries of hypotheses that have been given.

r A knot of tissue This is perhaps the oldest conception of the pathology and the Greek word $\gamma_{\alpha\gamma\gamma\lambda\nu\sigma}$ from which the word ganglion comes expresses the thought Hippocrates (10) refers to it and says that it contains mucoud flesh $\langle \mu \not \equiv \delta \vec{\alpha} \vec{\alpha} \vec{\alpha} \rho \kappa \vec{\alpha} \rangle^2$

2 Pupture of tendon sheath In 1746 Eller (4) found a ganglion adherent to a ten don sheath He examined it microscopically and concluded that the sheath had ruptured and that the fluid contained in the ganglion came from the sheath space with subsequent caling off of the opening made by the rupture

3 Retention cysts Gosselin (8) in 185, thought that they were retention cysts com ing from a combination of the corpuscles ous synoviaux and cryptes synovipires (subsynovial follicles and crypts)

them as mucinous tumors Meckel (16) in 1856 as serous cysts and Hoeftman (11) in 1876 as synovial dermoids Ledderhose (15) in 1803 in addition to considering them degeneration cysts also thought that they were true neoplasms Floderus (5) in 1015 said that ganglia are true neoplasms arising from an arthrogenous blastema i e a specialized connective tissue destined through growth and degeneration to form joints and tendon sheaths. On this basis he suggested that canglia be called arthromas Kuettner and Hertel (14) agreed that ganglia were neoplasms

4 Neoplasms Henle (o) in 1847 regarded

5 Hernation of tendon sheath or capsule of joint This hypothesis was discused by Nolkmann (4) in 1852 and by Billforth (1) in the same year. The latter left open the question of communication of ganglia with joints or tendon sheaths.

6 Origin from burse Vogt (3) in 1881

offered this opinion

7 Degeneration cysts Ledderhose (15) in 1803 and subsequently Thorn (2) Patr (18) Franz (7) Borchridt (2) Hofmann (1) I itschl (20) Clarke (3) and Thomson (1) advanced the idea that they were cystic degenerations in the connective tissue outside a joint

PATHOLOGY

For some vears we have been interested in the origin of gangha. We have made notation of operative findings and have studied path ological sections and the chemistry of the cyst contents. In no instance have we been convinced that gangha resulted from direct communication with joints or sheath spaces. On several occasions the joint has been exposed but only for one of two reasons namely operative trauma or an almost complete diappearance of the capsule and further in these instances that every sull has been complete and its contents have had no connection

y N w N k A d my f M d A 16



lig I Case hi tory 164640 \ typical multilocular anglion of the dorsal surface of the wrist of 3 years dura on in a 4 year old female. It was attached to the capule of the wrist point and extensor tendon sheaths.

with the fluid in the joint. The growths are ittached to capsules of joints tendon sheaths or both. What is left of this connective tissue apparently varies with the amount of degeneration it has undergone.

We believe that the so called false ganglia (those communicating with joints) and a similar cyst which Pick. (19) found communicating with the wrist joint postmortem are also evidences of complete degeneration of the capsule of the joint. Operative trauma might also produce such a communication.

The lesion consists essentially of a chief cyst which may be unilocular or multilocular surrounded in almost every instance by a group of accessory cavities ranging in size from microscopic up to an equality with the main cavity (fig 5). The wall of the main cyst is made up of a dense fibrous tissue resembling that found in the capsule of a joint. There is often a dense smooth shiny white membrane lining the lumen. This is simply a condensation of the fibrous tissue of the wall and has no special lining cells.

As a rule the cysts are filled with a thick sticky colorless fluid of the consistency of soft jelly (gelee de pomme) which is probably



Fg 3 Case h tory 83726 A cha cteristic ga glon f the vol r r dial reg on of 4 months durat on in a 26 year-old female



Fig 2 Case history 164640 Photo aph of specimen excised from case illustrated in Γigure 1

of the nature of mucin¹ Rarely the fluid is described as watery and occasionally it has been tinged yellow red or brown by blood pigment

A striking feature of the microscopic picture is the presence of what seem to be areas of degeneration scattered through the cyst wall (Fig. 7) and in the surrounding



Fig. 4 Case history of 522 Photo raph of a ganglo on a 1 year-old fem le. It was a prated and injected with half strength tincture of iod ne. lour years later ther was no evidence of re appearance.



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widely paced arregular interval throughout this tin led skein are rounded pindle haped or p by mil cells. The cell bodie are onicim f and ditended with vicuole (lig 10) in lire juently many protoplasmic proce e pre nut imong the surrounding network of cillian fiber (lig g) In the c area are often found large and mail rounded pices in which there are no cell and no libers. Where two of the courtie are in die gyrosimate in they may be incompletely eparated from one another by remnants of a h integrate! uptum (I ii 6)

The cobservation up et very strongly

that there has occurred a mucinous desentration of the colligen in a number of a olated but do dy approximated areas in the den e connective to ue adjacent to a tendon heath or the capsule of a joint. As the proce has idvanced small evit cavities have been formed and the coale cence of the e ha re sulted in the formation of one or more line cyst creater tilled with mucin. The occasional mitises that have been observed in the c ire is and the thickness of the walls of mo t gin hisugge that there must have been one cell probleration in and about the e area Whether this precedes the descnerative proc

ess or is coincidental with it we are not prepared to say It differs from my coma a true throus neoply m as occasted with mucinous



l, 8 Cach tor, 43383 I botomicro, all slowin two lundle of nerve hind (1) wi ounded by thick incurred leath pain the inhancier of decencition to the right of them; a mall cit coult. The mark livil it to the line the roust is well out the race it of ignoration hould be noted I rant Stout a I Clarke.

degeneration both in the multiplicity of foci and in the regular cyst formation. This obcryation leads one to suspect that the tissue increase is coincidental with the accumulation of the mucinous fluid because of the frequency with which the entire process ceases following its dispersal and absorption or its withdrawal by appiration.

The walls of the larger cysts are sparsely supplied with capillaries but no more so than the dense capsular tissue of joints. In the looser surrounding tissue there is usually a rather rich vascular supply With great regularity one finds that the larger vessels have very small lumens due to marked tibrosis of the walls. Even the capillaries are often thickened Kitschl (o) I horn (2) und others have suggested that these was cular lesions may have caused a local impair ment of nutrition with resultant degeneration We feel however that this hypothesis is inadequate first because such vascular lesions are commonly found in the neighbor hood of most chronic inflamm itions where no such mucinous degenerations are found second because patent blood containing can illaries are often found passing through and presumably furnishing nourishment to these areas of degeneration (Lig 11) and finally because the proces often ceases following i piration of the cyst contents a procedure which can hardly have much effect upon the



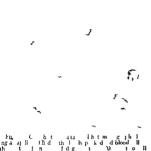
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blood vessels. We feel as do Payr (18) and kuether (13) that the vascular change is probably secondary to or concomitant with the exist formation.

There is remarkably little evidence of in flammatory cellular inhiltration in and around these lesions. The usual finding is the presence of a few mononuclear wandering



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cell in the immediate vicinity of some of the smaller ve sels. Occasionally, associated with trauma hamorrhage or infection larger numbers of mononuclear cells and polymor phonuclear leucocyte are found to be pre-

ent It th crili

It has been stated by some authors that angles have been found forming in tendons periosteum and nerve sheaths. As we have not observed any associated with tendons or periosteum we cannot confirm this. In regard to nerves we have frequently observed bundles of fibers passing through the areas of mucinous de eneration (Fig 8) and have found them adherent to the radial nerve at the wrist but as all of these cysts were in close approximation to a tendon sheath or capsule we felt that the nerve involvement was a chance one. This close connection with nerves may account for the pain and tender ness which are often associated with some Langlia

We have not observed nor read of malignant nooplasms arising from ganglia. Spontaneous infection of grugha occurs very rately. We have never observed spontaneous rupture of a ganglion through the skin but one patient stated that his ganglion had ruptured spontaneously through the skin.

TIBLE 1 -- INILISIS OF 253 CASES

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LTIOLOGY

1 pat n ntpe

Many authors have discussed direct trau my continued or sudden hard or unaccus tomed use of joint or tendon and individual constitutional tendency as causes of gan_bha

TABLE II -TREATMENT AND LATE RESULTS IN 255 CASES (CARP AND STOUT)

Mithelft tm t	С	P	C (t 1 1 w d	Log t tum (m)	Shtt tm (m)	A 5 t me (m)	R pp	D pp	Still P t
Operative	109	4 75	35	168	3	28 O	11 (31%)	4 (69%)	
None	81	31 77	12	60	3	36 5		7 (58%)	5 (42%)
Breaking	32	12 55	9	48	4	12 0	2 (22%)	7 (78%)	
Aspiration injection chemical irritant pres	16	6 75	8	72	1	55 5	(25%)	6 (75%)	
Strapping and pressure	7	2 74	3	48	1	20 0			3 (100%)
Baking and massage	5	7 96	1	to					1 (1007)
Aspiration and pressure	3	1 18	2	15	6	10 5	2 (10000)		
\ ray	2	0 78							

It is difficult to conceive of direct trauma to the dorsal surface of the wrist as the primary cause of degeneration of the dorsal carpal ligament as this ligament is well protected by overlying tendons. Some patients ascribe the appearance of the swelling to a definite trauma. Kuettner (13) found trauma in 20 per cent of his cases. On the other hand, there are many traumata to this region without subsequent formation of ganglia and it is hazard ous to stress this as an euological factor.

The importance of constitutional tendency is difficult to establish. The fact that complete excision of the ganglion has not as a rule been followed by a re appearance is not

easily explained

The preponderance of ganglia in the second third and fourth decades in females of slight build is generally a striking observation. The progressive diminution of the number of cases after the fourth decade and their comparative rarity in old age is also striking.

AN ATOMA

Those ganglia arising from the capsules of joints are intimately adherent to them usually by a broad base so that they can be excised only by sharp dissection. We have not been able to note a definite pedicle. Tendons are usually pushed aside by the cyst which also becomes adherent to tendon sheaths when these are present. On the dorsal surface of the wrist ganglia may occur on the radial.

ulnar or middle aspect. In most instances they are found over the articulations between the navicular and lunate bones and the lesser multangular and capitate bones Laterally they are bounded by the extensor longus pollicis and mesially by the extensor com munis digitorum and extensor indicis. The ganglia on the volar aspect of the wrist he as a rule laterally between the tendons of the flevor carpi radialis and supinator longus Here they are in close relation to the radial artery and in one of our cases this artery coursed directly through the capsule of the ganglion On the volar surfaces of the fingers the ganglia are intimately attached to the flevor tendon sheaths usually at their bases and in some instances they are also adherent to the skin

SYMPTOMS AND SIGNS

The symptoms may be grouped under deformity function and pain. The swelling may come on gradually or appear suddenly or the patient may give a history of alternate increase and decrease in its size. Quite often the chief complaint is a bone out of place or a weeping sinew about half the patients complain also of pain which may be present only on use of the adjacent joints or may also radiate from the region of the swell ing. Encroachment of the cyst on tendons frequently produces a sense of weakness in the fingers or toes to which the tendons go. The swelling may be very large or very small. On

O (ASES (NEUMIELLER AND ORATOR)

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the dorsal aspect of the writ and in the porliteal region they are apt to be largest and in two of our cases the swelling was 6 centimeter in diameter. The smallest ganglia occur on the flexor tendon sheaths of the hand where they attain the size of a millet seed or split per The swelling may be visibly multilocular (Fig. 1) but most frequently it is rounded not attached to skin but most commonly attached to the deeper structures Some gan_lia are almost invisible and very difficult to pulp the especially if they have not vet separated tendons. A ganghon on the dorsal urface of the wrist is accentuated by flexion and ice ersa one on the volar surface by extension. Most ganglia are very tense a few fluctuant and some vary in consistency It is safe to predict attachment of a ganglion to the apsule of a joint if the tenderness is marked Close relationship with a nerve or blood vessel may also cause marked tender ne s However Langlia which are attached only to flexor tendon sheaths of the fingers are generally quite tender

l oentgenograms give no additional infor mation except to show in some instances a shadow in the soft parts

\ differential diagnosis must be made from tuberculosis of the joint or tendon sheath lipoma myyoma sarcoma fibroma bursitis ostcoma and aneursm

TPF ATMENT AND PROGNOSIS

We believe that the treatment should be non operative in all cases except those in which this therapy has failed and in which there are persistent troublesome symptoms or

TABLE III -TREATMENT AND LATE RESULTS IN TABLE IA -TREATMENT AND LATE RESULTS IN 170 CASES (KULTTNER)

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deformity. The foregoing is based on a late follow up of 70 of our cases The types of therapy have been noted in the analysis. It is probable that complete operative removal of a ganglion will not be followed by a re appearance We have reason to believe that in our operative cases in which there was re appearance the removal of the evst wall had been incomplete. This indicates the absolute necessity of careful technique under strict asepsis and under a general anxisthetic and the use of a tourniquet in order to produce a bloodless field Prolongations of the cast wall must be followed until they are removed completely Nor should any so called pedicle be tied off Careful homostasis should be in sured. In the event of accidental entry into a joint closure of the capsule over the opening is not nece sary I firm bandage over the wound tends to minimize the chance of forma tion of a hæmatoma from an oozing capsule Infection will not only cruse potential danger from spread alon, fascial planes or tendon sheaths but will prolong the postoperative course and produce an ugly scar

Cases receiving no treatment occasionally give a definite history of spontaneous dis appearance of the ganglion This is cor roborated by physical examination Out of 12 cases followed in this group 7 gandla dis appeared We have the assurance of two doc tors who had ganglia of the dor al surfaces of the wrists that these disappeared spontane ously Some years ago one of us (L C)

observed a ganglion on the ulnar volar aspect of the wrist which disappeared in about of vears. There are several possibilities that might account for this phenomenon for instance, the ganglion might be ruptured by a trauma which was not noticed or degeneration might cease with subsequent absorption of the mucin

Ganglia which are broken by gradual pressure of the fingers or a sudden blow may never re appear as shown by 7 of the 9 cases followed in this group. As a rule those ganglia connected only with tendon sheaths are easily broken. It may be impossible however to break those which subsequently prove to be attached to the capsule of a joint which have a thick connective tissue wall and which are well protected by soft parts. It is this type which is almost always tender probably from pressure on the nerves and blood vessels of the capsule The expressed contents of the ganglion are probably ab sorbed and there is subsequent agglutination of the cyst walls There are others on the contrary which refill the cyst cavity with mucin thus causing a re-appearance of the ganglion

Aspiration of the contents of a ganglion with injection of an irritant such as tincture of iodine or carbolic acid gave good results in 6 of the 8 followed cases. This treatment should be followed by a pressure bandage and is especially indicated in those ganglia which cannot be broken and are troublesome.

Stripping baking and massage probably produce the same type of trauma as pressure and are not to be recommended because other methods of treatment are more effective

SUMMARY

- 1 We believe that ganglin are cysts re sulting from mucinous degeneration of con nective tissue. They occur generally in or are attached to capsules of joints or tendon sheaths but do not communicate primarily with joints or sheath spaces.
- 2 The degeneration proceeds with fibrillition of the collagen fibers and accumulation of mucin both within the cells and in the intercellular spaces. This results findly in the disappearance of cells and fibers in a number

- of adjacent areas These embryonic cysts coalesce and lead to the formation of larger envities. The cause of this degeneration still remains obscure but it is probably not due to any lack of vascular supply. Al though there is evidence of cell proliferation we are not of the opinion that ganglia are neoplasms.
- 3 They occur most frequently about the wrist joint volar surfaces of fingers dorsum of foot and pophiteal region Gangha are most frequently found in females of slight build in the second third and fourth decades. We are not convinced that trauma plays a major rôle in their production.
- 4 The chief symptoms and signs are swelling pain interference with function and tenderness
- 5 A differential diagnosis must be made from tuberculosis of the joint or tendon sheath lipoma my voma fibroma osteoma surcoma bursitis and meurism
- 6 Late results after various therapeutic measures have convinced us of the advisability of non operative treatment. So many gangha disappear spontaneously and after breaking and pressure aspiration and pressure or spiration with injection of a chemical irritant and pressure that operative therapy should be recommended only when non operative treatment has failed and when there are persistent troublesome symptoms signs or deformity. Careful complete excision of gangha under strict asepsis and with a bloodless field will probably not be fol
- a bloodless field will probably not be followed by re appearances

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ULCER CRURIS THE ETIOLOGY, PATHOGENESIS, AND TREATMENT¹

BY H O MCPHEETERS M D FACS MINNEAPOLIS MINNESOTA

TLCER cruris or the more commonly known varicose ulcer may be one of the most severe and disabling condi tions of the lower extremity Individuals so afflicted are truly victims and even though healing is successful they must endure their disability for the rest of their lives with a fear of a recurrence of the ulceration

The etiology is now very generally accepted to be a trophoneurotic disturbance and con dition resulting secondarily to the develop ment of varicose veins. Since the varicosed condition of the veins with the resultant stag nation of fluid in the tissues is the basic factor producing the ulcerations we must first dis cuss the etiology of varicose veins

The normal flow of blood from the foot is upward through the deep set of veins located among the muscles of the leg and the super ficial veins in the fatty tissue just under the skin The flow upward is accelerated (1) by the contraction of the muscles of the calf while walking and () by the aspiratory effect of respiration The latter has often been de nied yet it can be seen and has been experi mentally proved This aspiration is in two phases (a) from the upper extremuty during inspiration and (b) from the lower extremity during expiration Inspiration increases the negative pressure in the chest yet increases the positive pressure in the abdomen and vessels below the diaphrigm Expiration with the diaphragm rising produces an aspiration with a negative pressure below the draphragm assisting the upward flow of blood in the veins of the extremities This back pressure during inspiration acting on the valves in the femoral and saphenous veins at the saphenofemoral junction aids the reflux flow of blood in the superficial set of veins

Back pressure is further increased by the intra ahdominal pressure from he wy lifting It is increased by pregnancy with its mech anical obstruction as well as the great increase in blood volume supplied to the iliac vein by the greater vascularity of the uterus (Kow natzki and Lochr)

In addition to these causative factors we have conflicting theories regarding other fac Sicard of the University of Paris be lieves that the condition can best be explained by a lack or absence of the endocrine functions of the ovary Kashamura the Japanese sur geon believes that they are entirely due to the loss of the neuromuscular tone of the vein wall Von Meisen of Copenhagen believes varicose veins are associated with a general weakness of the connective tissue structure of the body and accompany such pathological states as flat feet enteroptosis varicoccle etc Schambacher and Lederhose believe that there is a congenital weakness of the vein walls Bregman believes that there is an angio sclerosis and phichosclerosis similar to that of arteriosclerosis as the primary factor Zinser and Phillip both believe that syphilis plays a factor in a larger percentage of the cases than we have thought. Some authorities notably Fischer Nobl Renzi Hesse and Schaak believe that the condition is best ex plained on the theory and basis of a former infection involving the vein wall and probably embolic in nature. This would account for the multiple segments of veins involved better than any other explanation I am firmly con vinced that the great majority of cases can best be explained by the infection theory with

heredity as a predisposing factor As a result of various causes the veins lose their power of carrying the venous blood to the heart and become dilated and filled with stagnate blood Sooner or later the difference in pressure between the blood in the veins and the fluid in the tissues is equalized. Then by the process of stasis the tissues become water logged and their resistance to infection or trauma becomes lowered because of impaired nutrition As a result an ideal condition for the development of the varicose ulcer is pro duced Figure 1 is self explanatory of this condition as it shows complete loss of valve function in superficial and communicating veins and the association of venous blood with

tissue saturation

The immediate cause of the tis ue break down is often trivial. It may be embolic and due to infected teeth tonsils hamorrheids tte or as frequently happens it min re ult from light trauma and terminate in local necrosis. If not cared for the affected v uns may increase in size and number the con gestion may increase the ulcer may penetrate deeper and may re ult in a punful peris titis of the tibia. However the price s mit be limited and cured by prompt efficient treat ment although the ulcer cycle ilways can e much damage to the circulation and mitrition of the tis ue and leaves the ti ue far more susceptible to ulceration. Ultimately, follow ing voirs of ulceration and healing the tis ues become so indurated that a continuous poten tial state of gangrene exi to and ulceration can be prevented only with the help of ex ternal upport

I ATHOLOGY

The actual ul cration begin with 1 g in grene and separation of the uperficial lavers of the skin. At time the arca takes on the typical appearance of a carbundle while in other cases is a re ult of a long truthing on dition the ulceration extend through all of the dermal layers. In some cases the whole lower leg has the appearance of an extensive far advanced weeping eccema

Microscopic sections through the ulceration demonstrate that the pathology is largely in the skin and that there is only an inflam matery reaction of the tissue beneath

Breteriological examination of the ulcers has proved that there is no constant organi m that may be held as a specific cause. The staphy lococcus and streptococcus are found in all cases and are usually a sociated with other organisms. In no instance regardless of the severity of the case has the La bacillus or bacillus of gangrene been found. I rofessor Gabor Nobl states that he does not believe that there I any relation between the type of infection or bacteria in the ulcerating area and the lowne s or rapidity with which the ulcer heals. His opinion was confirmed by the extensive work of Lowenfeld on the Bac teriology of Varicose Ulcers which shows that those ulcers which heal most rapidly often contain the most bacteria. My expenence

DIFFFRENTIAL DIAGNOSIS

In di cussing the differential diagnosis of vincose uleers we must consider the syphilitie the tuberculous the rodent (malginint) and the river forms of ulcerating conditions of which the most common would be actinomy

- r I arrease ulcers are by far the most com mon ulcerating condition of the lower extremities and are of all sizes shapes and con 1 ocasted with the ulcer there is usually a well marked area of inflammators reaction which at times will pread for several in hes beyond the open ulcer The ulcer as uell as the surrounding tissue may be very tender. The edges are usually loping in appearance and the base is ordinarily covered with large coar a granulations and a gravish exadite The discharge may be very profuse As already stated the chiated varieous veins with their reflux flow and recompanying con Lestion are accepted a being the ear e of the variesse uker. One can nearly always find the e large venous channels about the ulcer ating area. Sometimes the veins lead directly into and under the ulter and in the e case a very positive diagno is can be made (Figs
- to 2 inclusive)
 2. The symbiate indeer usually has punched
 out sharply defined edges, which at times are
 rused. It is ordinarily deeper than ulcers
 ursing from other causes. The base is dark
 red and has large granulations which may be
 unusually large in the larger ulcers and may
 bleed very readily. Much serum evudes from
 the surface but this does not give the impres
 sion of being pus. Luctic ulcurs may assume
 my shape or condition. In addition to the
 clinical appearance a positive Wissermann i
 present and often a history of the original
 infection is obtained.
- 3 The Inherculous ulcer is uncommon on the lower extremities The edges are usually undermined Some authors at the three theorem outline giving, the impression at times of a half eriele but this is not a tuberculosis threateristic. The bac is seldom red and granu

lating as in the luctic ulcer but more frequently is covered with a grayish necrotic crudite. It is thought that the tuberculous ulcer is always secondary to tuberculous else where. An active tuberculous would of course be a definite diagnostic sign.

- 4 The roden or malignant ulcers are in frequent on the lower extremities although common elsewhere they are found in older patients and do not have the local inflam matory reaction which is seen with varicose ulcers. There would be no varicose veins except as a coincidence and there would be no response to the usual treatment. With a negative Wassermann no symptoms or signs of tuberculosis and with no response to the usual ulcer treatment a biopsy should be made to confirm the diagnosis.
- 5 Troplus ulcers can usually be diagnosed without difficulty after consideration of the clinical history of the case
- 6 The actinomycotic ulcer starts as a nodule subsequently brealing down leaving a nec rotic base with scrittered yellowish nodules. This type of ulcer is very rare and is seldom seen except in hide handlers etc. The diagnosis would be suspected when cure had resisted all treatment. Curettings should be made from the ulcer base with examinations for the ray fungus.

TREATMENT

The results of treatment of ulcer crurs have always been unsatisfactory. Ontherents and lotions are legion and include those used by the Indian healers the miracle men the professional quacks and those employed today by the profession. Silver nitrate is by far the most efficient of all although any ountment supported by a bandage may prove useful The Unna cast is I believe the most efficient.

Boynton's adhesive strapping for support directly over the ulcer has many advocates and is often efficient due to its support of and pressure on the granulating surface

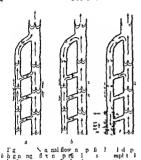
Pondorff favors the vaccine treatment. It is believed that an autovaccine made from the organisms infecting the ulcer area is of much value. La de Gaetano and several other authorities on the subject believe that the results obtained following the use of Boyntons.

adhesive strapping or with the Unna cast are due in large measure to the softening of the tissues by the continued local bathing by the secretions of the ulcer with a secondary re absorption and autovaccination from the bacteria present. It is probable that such is actually the case and that this is a large factor in the good recovery obtained in some of the extreme cases.

In the past the surgeon has felt that oper

ation is necessary and has devised all sorts of procedures having as their goal the correction of the defective circulation A common oper ation is the Schede multiple circular incision The surgeon here attempts to cut and ligate all vessels of the offending and superficial group of veins Babcock advised stripping the main vein with his specially devi ed strip Charles Mayo improved on this and today his is a popular method and has fre quently given good results. Some ruse the fat from the deep fascin from one Schede in cision to another thus hoping to break all the communicating veins. This is efficient if there is only a plexus present but if the condition is extensive and scattered it is almost useless Other surgeons have made long incisions from groin to ankle removing the long saphenous with its side branches but an unsightly scar results and recurrences have been frequent Some have made circular incisions about the ulcer hoping to break all venous supply. These methods entail preliminary bed rest with ele vation for the badly infected cases Operation is contraindicated until the condition is brought under control

The injection of sclerosing solutions is the most modern and efficient method of treat ment when the vens are the chief cause of the ulcers. It accomplishes better and more thor ough results than the operative treatment and has the added advantage of not necessitating hospitalization anasthetization bed rest loss of time from work risk of infection and extensive operative incisions. When the proper technique is employed no disfiguring scars follow this treatment and there is less danger of embolus than from operative procedures. The injection treatment can be started at once in cases of badly infected ulcers and the results are thereby hastened



n upera lad mm

The technique of the injection is simple and follows the method of Linser Sicard Nobl and you Meisen. I have added the use of a tourniquet so that temporarily the solution will be retained locally and the sclerosing effect will be insured. I use a 20 per cent salt solu tion for all extensive cales the 60 per cent and 76 per cent calorose for the isolated varix which is often left after the use of the salt injection or in cases in which there is one long vein with a di tinct positive Frendelenburg and the 30 per cent and 40 per cent sodium salicylate in the occasional case that does not respond to salt or calorose. I have used a per cent mercune chloride in 3 cases during the past year because the veins resisted the sclerosing effect of other solutions. For each solution there is a definite indication and a definite characteristic reaction, some reactions being more extensive than others The most important point in the technique is that the injection must always be within the lumen of the vein. This is absolutely imperative in order to avoid sloughs and complications With the proper technique and proper choice of solution the ideal results are obtained (Figs 8 o 10)

When the affected veins have been de stroy ed and the circulation has been corrected the ulcer heals quickly under routine treat ment. This is accomplished by the method of Rodolfo klapp of the Clinic of Berlin with the additional use of a large rubber sponge as advised by Professor Nobl. In the case of large ulcers skin grafts are made at the proper time. The rubber sponge aids in givin the needed support to the leg and by elastic compression forces the excess fluid from the tissues at the same time removing the continued stignation of fluid in the ulcer area. The method now used is as follows.

Inject and sclerose all veius as fast as they can be found.

2 Apply silver nitrate locally the strength of the solution depending on the type of gran ulations present

3 Cut a good grade of rubber bath sponge o as to cover 1 inch beyond the edge of the ulcer

4 Cover the ulcer with gruze fluffed for better absorption

5 Apply the cut rubber sponge over the ulcer

6 Cover all with two layers of glizzed cot ton widding which is impervious to the dis charge and helps keep the bandage clean

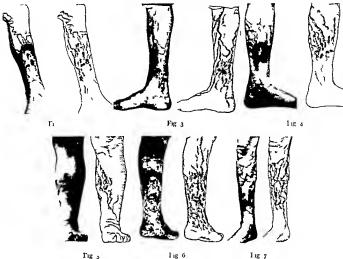
7 Bandage the leg with a good grade of cotton elastic bandage similar to the Ace and preferably 4 inches in width. This is put on from knee to toes and as tightly as it can be wrapped.

8 Change dressings every to 3 days as needed for comfort and care of the discharge o Continue the rubber sponge pressure

until the ulcer has completely healed

to At the proper time judicious use of skin grafting will very materrilly shorten the period of healing. This however should not be done until after careful and complete sclerosing of all the offending veins and complete elimination of the lyimphingitis and extensive tissue infection about the ulcer have been effected. The ulcer bed should be carefully prepared as for any skin gruft.

it In all cases as soon as the ulcers have healed put on an Unna cust for continued support. This is most essential in cases in which skin grafts have been made and must be applied before the patient leaves the bed. Change this cast every 2 weeks at first and then every 3 to 4 weeks. In all extensive cases this must be continued for a long time either



Figs to 7 Sloving the intimate relation of vein to the ulcer. In Fig. 61 hown a fungur infection of eccematod rin, worm on the foot and leg which often complicate the ulceration.

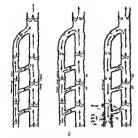
by casts bandage or the elastic and rubber stockings In some cases the patient needs this support the rest of his life in order to avoid a recurrence

Many men have associated calcium in balance with ulcer formation but so far at tempts to correct this have failed. I beheve that the use of the average parathyroid extract by mouth is useless. Of late I have been using paroiden hypodermically twice a day. This is thought to be the active hormone of the parathyroid gland prepared according to the technique of Dr. Adolph Hanson of Fan bault Minnesota. The cases as yet are too few to report but blood calcium checks show a marked increase of calcium content under its use and I feel that the cases have responded more rapidly than have case in which it has not been employed.

COMPLICATIONS

r Complications associated with the ulcerating condition itself a The most common complication associated with variouse ulcers aside from the coincident phlebitis and lymphangitis locally is a pruntis which at times extends over the whole lower leg. This at times is very resistant to treatment and frequently recurs. It is best cared for by two applications each day of Burrough's solution diluted it to io. This is a solution of aluminum acetate plus a small amount of acetic acid. Some advise the use of the aluminum subacetrate in a 8 per cent solution and then diluted i ounce with 500 cubic centimeters of water. This is applied in the form of continuous wet packs.

b A fungus infection similar to what Strickler calls eczematoid ringworm and crused by the epidermophyton fungus This



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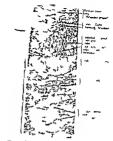
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he is the truth comined kin near the test of and hetwen the toe. At the whole kin will form large very terbar paintal blob filled with a truth lucent if it nextreme end the tough skin becomes whitened and moverated and will peel ou in large area leaving a secondary infected by the Burrou hasolution. At time it is very restant and mut be treated by a triple and may be a treated by the Burrou hasolution. At time it is very restant and mut be treated per a tenthal tringing with one on intensity has been defined in the first and and benzoic tend and has marked keratolytic effect. I courrence are



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2 Complications associated with the injection termined a If periva cular injections are carelessly made a slough will occur especially when the salt the sodium salicylate or the bichloride solution is used. It is not o constant or severe with the calorose of boll or

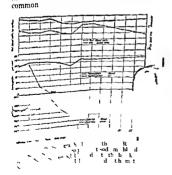






Fig. 3 and 14 Mrs C Slowing condition before an 1

any of the sugar solutions If a perivenous or extravenous injection has been made the first and immediate sensation will be a severe burning at the point of injection. Three or 4 minutes later a definite circumscribed blanched patch will appear. Within to or 15 minutes this patch assumes very definitely circum scribed bluish gray discoloration. This is

absolutely pathognomonic of an extravenous

infiltration of the salt solution If the infiltra

tion has been made more deeply this sign will

Γ₁ 1₄ Γ_{1g} 1₅

I 1_g 1₅ Wr I W Showing condition before and after

not appear until later and the burning sensation must be considered sufficient evidence to institute corrective treatment. If this is allowed to go untreated for 24 hours this patch will have assumed a bluish black discoloration with the formation of a large vesicle over the entire area. Tollowing this there results a dry gangrene which terminates in a slowly healing ulcur. Extensive infiltration of the area with normal saline at the first indication of this sign so as to care for the excess salt.



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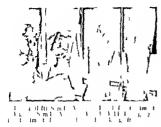
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Fig 2 I rank S Varico e ulcer before treatment November 8 19 7 Fig 3 Frank S Var o e ul er after t atment by

Fig 3 Frank S Var o e ul er after t atment by mean of vein injection and econdary kin graft Janu ars 31 1928



injected will a id the lin han feliminate every detre ince mellerten which with proper technique hullat cur lln i t positive character ti n lite n re ulting from t peny i cul ir inge ti n of o per cent ilt selution in la preventible by in extensive infiltration for rmal aline in the in volved area. St. rile water has been employed for this condition but give greater pain and a more extensive reaction luring the following 48 hour \ \ \text{imil ir reaction develop follow} ing a perivenous insection of a hum subcylate or bichlori le et mercury The injection of normal saline however doe in t prevent the development of the slow h and amprene when these olution are used. When a sloughing cangrenou areador develop it i be the ited by surgical removal 24 hours foll wing the injection. The ti sues are then brought to gether by an immediate closure and primary uture The edges shoul I be re enforced both by suture and adhe ive stripping. The procedure however should be done under the most meticulous asentic conditions tempted the in one cale at the dispen ary where we were not prepared to do major ur cery and unfortunately a treptococcic und in infection resulted and later developed into i streptococcic septicamia followed by death of the patient

b Ascending chemical phlebiti at times occurs following injection. I believe this crib be caplained by the fact that the communicating valves function normally and the reaction of the injected its uses merely proceeds up the aphenous vein to the saphenofemoral june. tion similar to the closed end of a water pipe. However, this is exactly what I wish to have occur and the condition no longer causes an concern. If it were in infections thrombo philothis then I would worry but is long as feel that my technique has been perfect and no infection has occurred I am happy to have this limbing. When infectious thrombophle bits doe occur however the this, h should be supported by strappings of 4 inch strip of idliessees on sto make the patient more comfortible and to help quiet the reaction.

of the staphylococus infection with ab ces formation at the ite of the injection and in the large loop may occur as the result of inefficient sterilization at the ite of injection or extensive infection through the true from a sloughing ulcer. The two latter complication however can be avoided and with the proper decision and technique at the time of the operation hould not occur. The enfections are very tender and must be opened and drained. Large hot wet packs applied to the infected area quiet the punful condition must be opened.

This report 1 based on the care and treat ment of 348 cases of variety evens of which 63 have had ulcerating complication

SUMMIT AND CONCRETIONS

1 Uker cruri is the endre ult of the trophoneurotic di turb ince in the leg and joot resultant from the transition of blood erum in the tissue coondary to varico even

The attempt to cure the alter first and the veins second is wrong both in theory and

practice
3 The various veins are obliterated for better by the injection treatment than by operation

4. The supportive bandage for the affected extremity with the rubber sponge pre-ure over the interaction is the oldest and yet the most efficient treatment of the present day.

5 Judicious employment of the skin graft at the proper time greatly shortens the period of healing

6 All the long standing of e with extensive involvement must have continued support for long periods of time to word recurrence.

- The duration and extent of the support must be decided in each individual case
- 8 Finally by the use of the described technique all varicose ulcers can be healed and kept healed If they cannot it means that the operator has not been keen enough to locate the vein which causes the condition and which is often under the ulcer bed or that he has been negligent in giving the extremity the necessary lasting support

I vi h to thank Dr Louis Dunn for his many adual le and helpful criticisms in the preparation of this article I also with to acknowledge the valuable assistance of Dr Cal O Rice of the Out Patient Department of the Vinneapol General Ho pital where most of this work la) een dene

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injected will in a lithe land in a climinate a very di tre ince mph in a shi h with proper technique hould not ur This is ndu n reulting postive character to from a pen a culir intetrin loper ent salt solution and 1 17 1 nt il h by an exten ive infiltration to road also in the in volved area. Sterile water h. been employed for this con liti n but is r iterpain and a more extensive r a transmiring the following 48 hour \ imiliar rea to a develop follow ing a perivenou inj tion t schiim salicylate or bichlori le 1 mercury The injection of normal aline have er le n t prevent the development fith light and ingrene when the e solution are u.c.l. When a loughing gangrenou areadous levelon da best treated by surgical rem vil 4 hour followin the injection. Ih ti ue tre then brought to acther by an imme hite cloure and primiry suture The edge should be re entorced both by uture and idhe ive strapping. This pro cedure howe or hould be done un ler the most meticulous iseptic conditions. I at tempted the in one calc at the dispensary where we were not prepared to do major ur gery and uniortunately a streptococcic varid ans infection re ulted and later developed into i treptoeoccic septicamia followed by death of the patient

b 'Asending chemical phlebitis at time occurs following, injection I believe this can be explained by the fact that the communicating, valves function normally and the reaction of the injected it sites merely proceeds up the saphenous vein to the saphenofemoral june.

tion amiliar to the clocklend of a water pipe. However, this is exactly what I wish to have occur and the condition no longer causes an concern. If it were an infectious thromfo philatins then I would worry but as long a leed that my technique, has been perfect and no infection has occurred I am happy to have thus finding. When infectious thrombophie bits does occur however the thigh should be supported by strapping, of 4 inth strips of the internal controlled in the same and to help omet the ration of ortable and to help omet the ration.

c I rue stephylococcu infection with absecss formation at the site of the injection and
in the large loops may occur as the result of
inefficient sterilization at the site of injection
or extensive infection through the true
from a sloughing ulcer. The two latter complications however can be avoided and with
the proper decision and technique at the time
of the operation hould not occur. The exfiction are very tender and must be opened
and drained. I arge hot wet packs applied
to the infected area quiet the prinful condition much.

This report is be ed on the care and treat ment of 148 case of varies even of which 63 have had ulcerating complication

SUMMINE AND CONCLUSIONS

r Ulear cruris is the end re ult of the trophoneurotic disturbance in the lea and foot resultant from the stagnation of blood crum in the tissue secondary to various even

2 The attempt to care the ulcer fir t and the verific econd is wrong both in theory and practice

, the varies e vens are obliterated for better by the injection treatment than by operation

4 The upportive bandage for the affected externity with the rubber sponge pressure over the ulceration is the oldest and vet the most efficient treatment of the present day.

5 Judicious employment of the skin graft at the proper time greatly shortens the period of healing

6 All the long standing case with extensive involvement must have continued support for long period of time to word recurrence.

The duration and extent of the support must be decided in each individual case

8 Finally by the use of the described technique all varicose ulcers can be healed and kept healed. If they cannot it means that the operator has not been keen enough to locate the vein which causes the condition and which is often under the ulcer bed or that he has been negligent in giving the extremity the necessary lasting support

I wi h to thank Dr Louis Dunn for his many valuable and helpful critics ms in the prepa ation of the article I al o ish to acknowledge the valuable assistance of D Carl O Rice of the Out Patient Department of the Vinneapolis General IIo pital where most of this wo k has le n dane

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ACUTE THYROIDITIS

A STUDY OF SIXTY SEVEN CASES

B C C BURHANS BS MD PILAD L IN

CUTL thyroiditi with or without abscess formation occurs commonly enough to warrant careful study so that its presence may be diagnosed and proper treatment instituted Although it is regarded as a rare occurrence by many authors. I have found over 200 cases reported in the literature Kobertson (33) in 1911 reported of cases Hagenbuch (10) in 10 I reported 43 cases and I have selected 67 out of over 80 cases which have occurred or have been reported during the last decade. Fur thermore many of our clinicians do not had time to record their experiences in literature so that the tendency is for only a minor proportion of ca es of any disease to be published It this be true acute thyroiditis is not 1 rare a malady as the medical profession has been wont to believe

My attention was first drawn to this lisea e when I was called upon to treat the tollowing case. I report the matter here in detail because it has many interesting feature which will be discussed later in this paper and because it is only fair to future students that concise but accurate case reports be diven so that those wishing to accumulate data can have material with which to work.

The pati nt vas a fem le ged 77 years who omplained of a painful swell g the neck. For many yea she had had a mall lump ter r part of the n k about n the midl e gion of the thyroid isthmus. This had not caused emptoms u til 5 days before dm ssion to th hosp tal wh n t b gan to enl rge and become pa n ful The swell g spread to the right side of the n ck nd the pa radi ted b k to the ear Turpentine poultices w re applied but did not give rehef. The ell ng b ame moe marked but there w s no t rier no with r spiration or deglutition no ugh nd no hoarsene s There were no symptoms thype thyroid sm or hypothyroidism Tioic ks b fore admission the pat ent had had a head cold nd phary git Oth rwise the card orespiratory history was negative. The gastro intestinal history as all o negative. The patient had suffered from frequency and no turns for some time but there was no burning hæmatur a or pyuria. She com plain d of polydipsia. Ih family history was n gative for thyroid di turbanc. I hysical examination r. al. d a poorly noun hed elderfy woman with a red si clling 5 centimeters in

diameter low down in the neck anterior in the mid I ne. The tumor was slightly tender a ditense and ga as sation of fluctuation The process seemed to e tend into both lobes of the thyroid gland par ticularly the right lobe. There was posterior d plac ment of the large vessel on the right sid S allo 1 g as easy and pa nless and caused the swell g to mo e anteriorly but not up and down There as no exophthalmos L amination of the ch st and abdomen wa negative. There was no d fo mits of the c tremities no tremor of the hand o I sion of the skin no bone tender ess. The r fl xes ver normal. The patie to temp ratur as 90 8 d grees F pul 9 and r spiration 6 Ih blo d count sho s d 4 050 000 r d blood c ll t per cent hamoglob n 18 000 leucocyt s and 87 per c nt polymorph nucl ars The urinily i sh elahavy loud of sugar no act can i da toaid 326 milligrams per cent blood sugar

m tabol m as 11 s 3
\(\) d agno is of acute there ditis with support on

21 7 mill grams per cent blood ur a

and dirab tes was made

An i c i v s a plied for the night. In the mor i g the p tient had s ve p n dyspina a i a h tl g r spiration an i was coughing up small amounts of bloody mucus. There was pain on swallo ving.

Op rat n u der novocan local anæsthesia s prform dat once \ \text{smill transverse incis on was mad over the s ellingin the midline. After the skin and subcutaneous its u s had been opened an explorat \(\) puncture was made and a thin ser a gumous flud as obtained. The transvirse inc so on was thene tended the antenior plane of the deep facture was split longitud all, and the sternothyroit and sternotyo d muscles were retracted laterally e posing an becess wall. The state of the deep to the state of the state of the state of the flo cd by thick, yellow pus. The abscess carvive as f und to extend o t to the deep vessels o ither side. O e rubber d ann as inserted. Cultus showed they ene of statephylococcus auteus

The onvalesc nee vas lo g and storm. The dabete condition was hard to control in spite of the f ct that the wound v draining freely. One week after the operation the patient develope l an erspap las of the face the process apparently starting near the draining sinus and extending up



I ig 1 Tissue removed at operation lov in necrosi of glandular tissue with some colloid till pre ent in the d generated acim

over the nose and checks The sinus drained a great deal of pus Ten days later the erysipelas had cleared up the sinus was still draining pus and the diabetic condition was fairly well under control I wo days later bowever the patient developed a chill and the temperature rose to 103 degrees bloody diarrhoea started and lasted for 2 days The patient complained of pain in the kit knee over the suprapatellar bursal region. This bursa became red and swollen and aspiration revealed pus due to a staphylococcus aureus infection The bursa was meised widely Iwo days later the patient de veloped pun in the knee joint. As the joint was red and swollen and aspiration stelded pus an opening was made on either side under gas anasthesia and a large quantity of thick pus was evac uated No drainage was introduced Willems method of active mobilization was pursued since there was no bone pathology The joint drained freely but a week later an infrapatellar bursitis developed and was treated by free meision. The infection spread along the patellar tendon into the tibia and an osteomyelitis developed Amputation was advised but the patient refused to permit it Blood trans fusions were given so as to build up the patient's resistance The ostcomyelitis finally spread into the fi mur and the patient gradually became weaker and died 3 months after the occurrence of the first at tack of thy roiditis

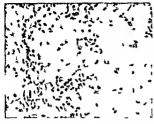
An autops, was performed and the theroid gland removed. It was found that the suppuration had occurred in an adenoma with the pus burrowing either way so that it lifted the capsule from the right and left tobe. The remaining thyroid gland was filled with adenomata and showed signs of recent inflammation. There was an osteomy-elitis of the tibia fibula and femir and a suppurative atthin its with destruction of the right knee joint. Death was due to toxymia and exhaustion.



Fig 2 Photomicrograph of the diseased thyroid tissue removed at operation. The necro is of the tissue is a marked that only the presence of colloid makes a diagnosi nos the High power.



 Γg 3. Ti vroid it sue shoting acute inflamm time the resultant on of the capillant s polymorpho user infiltration of their terstitudin use and the acin 1 kmor thage into the intestitudin it sues and acin 1 compatible of the colloid, and all types of cell pathology ranging from loudy swelling to complete in crois



ANATOMICAL FACTORS

An itomically the thyroid gland ha cert iin characteristic which render it re istant to infection. It is a deep scatted sland well protected against external injury by heavy ta cir and mu cle It has no duct along which infection may trivel to reach the parenchymatous structure | fer i tence of the thyroglos al duct or duct of His leading from the pyramidal lobe to the foramen cecum does hive a direct communication with the pharyny Meeker (8) has reported i case of infection through a per istent duct Stein (27) has reported a cale of above s of the pyramidal lobe following an upper repiratory infection | this i probably due to the preading of infection along a per istent thyroglo sal duct

The fland his a heavy capsule forrid by but on of the uperioral layer and the pretriched layer of the deep la ca. It is over laid by the sterne throad sternohyoid and plittyma mu cles anteriordy and by the ternocleidal muscle on either ide. This deep fiscult tend to protect the thy road from in a ion by infection in the contiguous structure, the infection being contined to it acial compartment and triveling up and down but not through these fibrous columns. The heavy overhing, faster and muscles tend



Ilti fthild solthing h. t. | hompi | l | lintlet of th | litil | li millit alg

to make early enlargements of the thyroid and fluctuation in the thyroid difficult to

The rich blood supply of the gland is provided by the comparatively large superior and inferior thyroid arteries. Venous drain as through the superior middle and in ferior veins free. The vascular transperient in the gland itself consists entirely of an intract meshwork of minute capillaries supported in a tine fiber ela tic stroma. The lymph drainage is unusually free and according to Williamson (47) is provided by a specialized anastomotic arrangement of capillarie within the lobult.

PHYSIOLOGICAL PACTORS

The physiolo, of the gland has been intensely studied but 15 not well understood. The secretion enter the blood stream either through the 15 mphatic or blood capillaries both of which form a complicated network through the glandular tissue. According to some authors this internal secretion has beternoted property. Wathins (45) believe that the renewed hormone content of the blood after it reaches the thy rold determine the failure of extraneous material carried to the gland to be readily deposited therein or to undergo the characteristic evolution there.

The physiological mereuse in the size of the gland together with the accompanying anatomical changes that occur at puberty during pregnancy during menstruation and during severe fevers makes the gland more susceptible to infection. In fact, many of the cases of acute thyroiditis not due to direct trauma appear after a period of physiological stress In 67 cases 13 followed delivery 9 followed pneumonia 5 followed typhoid fever and 3 occurred in young girls at puberty following acute upper respiratory infections Femiles are attacked with acute thyroiditis more often than males and the highest percentage of occurrence is found during the child bearing period (o to 40 years) Robertson (33) found 52 females in 96 cases and I found 47 females in 67 cases Teanselme (20) remarked in 1805 that preg nancy reacts on the thyroid and transforms it into a veritable venous sponge Following pregnancy the thyroid hypertrophy di minishes but never completely disappears That anatomical and physiological distur hances following this evolution and resolution oecur and render the gland less resistant to infection can be readily understood

As in the uterus and breast structures undergoing great physiological changes dur ing puberty and pregnancy adenomata form frequently in the thyroid These adenomata are sites of fibrosis abnormal cell proliferation blood vessel distortion and frequent hemor rhage all producing areas of lowered resis Moreover the adenoma produces atrophy of the surrounding acim together with a localized fibrosis slight inflammatory infiltration and thickening of the blood ves sel walls a chronie non suppurative thyroid itis which Warthin (44) believes is due to mechanical pressure This inflammation produces an area of lowered resistance to any extraneous material that may reach the gland In 24 of my 67 eases adenomatous gorter was present before the acute thyroiditis developed in 31 of Robertson 5 (33) of eases gotter was present first and in most cases was adenomatous

To summarize one may say that the rich blood supply and the production of the thyroid hormone tend to prevent infection of

the thyroid while the physiological changes occurring during puherty menstruation preg nancy and acute infections and the develop ment of adenomata in the gland tend to lower the resistance of the thyroid

PATROLOGICAL ASPECTS

Thyroiditis may be acute or chronic suppurative or non suppurative and acute reac tions can be iscertained clinically in the suppurative lesions In my own case consid crable necrotic tissue was removed at the operation There were areas showing dilata tion of the eapillaries polymorphonuclear infiltration of the interstitual tissue and the acini hamorrhage into the interstitual tissues and the aeini congulation of the colloid and all types of eell pathology ranging from eloudy swelling to complete necrosis Clute and Smith (9) likewise found dilatation of the capillaries with diapedesis or frank homor rhage leucocytic infiltration of the alveolar epithelium and even the lumen of the acini They also found diminution in the amount of colloid with replacement by a granular precip itate

The acute inflammation may resolve or go on to suppuration and gangrene Resolution oceurs hy absorption of the lymph and new cells and by the changing of the ancioblastic and fibroblastic tissues into vascularized fibro tie tissues Watkins (45) found evidence of acute reaction in some of the interstitual types of thyroid removed at operation where active inbroblastic proliferation was occurring. Acute non suppurative lesions are transitory in character resolution occurring within a week or to days Of of eases reported by Robertson (33) 56 were of the non suppurative type of my 67 eases 4 resolved without suppuration One of these followed delivery one followed the grippe (and had occurred for successive winters), one followed trauma to the neck and exposure to the cold and one was primary

Acute suppurative lesions may consist of multiple miliary abscesses or may he large pus pockets involving one or both lohes of the thyroid Most frequently the right lobe is involved next in frequency the left lobe and Stein (37) reports a case in which the pyram idal lobe alone was abscessed

Chronic non suppurative thyroiditis of the non specific variety is seen in the neighbor hood of adenomata and 15 associated with pressure atrophy of the acini There is a localized fibro is of the interstitual tissue slight round cell infiltration and thickening of the blood vessel walls. Of the specific non suppurative variety tuberculosis and syphilis occur. Fuberculosis of the thyroid is charac terized by the development of a hard nodular tumor of rather rapid growth lathologically the picture is characterized by tuberculous granulations tibrosis caseation and calcui cation Microscopically the picture is typical of tuberculo is an avascular concentrically arranged mass of cell consisting of a central area of caseation with multiple foreign body giant cells surrounded by a ring of epithelioid cells about which is a mononuclear round cell intiltration of the lymphoid type Secondary infection does occur and an acute thyroiditis with abscess formation may result. Vinniy (42) operated on such a case. The ab cess occurred in the inferior region of the neck and after incision healed in a months. Seven years later another abscess pointed at the inferior end of the old incision. The surgeon probed the sinus and thought the condition was Pott s disease as there was a sensation of roughness and grating as imparted by diseased bone. He also found a sinus leading posterior to the sternum probing at the bottom of which imparted a similar sensation and led him to believe that there was an o teomy chis of the posterior surface of the manubrium. Only at operation did he find that he was faced with an acute thyroiditis with abscess formation superimposed on a calcified this mid

Syphilis occurs in two forms the diffuse thyroidits syphilitica and gunimate of the thyroid Davis (10) reports 1, cases of syphil. The pathological picture is chiracteristic of syphilis is it appears in other tissues. In diffu e thyroidits syphilitica, there is perivascular round cell infiltration with fibropers assisted and angioblystic profiferation and a progressive endarterities of the regional blood vessels. In the guinma there is a central hard firm area of coagulation necrosis surrounded by dense tissue rich in epithelioid cells and closely infiltrated with mononuclear wandering

cells Giant cells may be present and there is usually an associated obliterative endartents of the smaller vessels. No neute superimposed thyroiditis with or without abscess formation has been recorded in the literature.

Piedd's (3) ligneous thy roditis deserves consideration at this point. The chology of this process is unknown and there is doubt as the list true inflammatory nature. It is characterized by a marked thorosis of the thyrod with adhe ions to the adjacent structures that are so firm that the condition is usually diagno ed as malignant. No report has been made of an acute inflammation superimposed on a ligneous thy rodities.

Many pathologists on finding localized col lections of lymphocytes with or without germ centers in glands examined for exoph thalmic goiter toxic adenoma and toxic hyperplasia have called the picture thyroid itis and as igned this is an explanation for the toxicity Watkins (45) however believes that the clymphocytic cell collections are not inflammators but are evidence of a thymico lymphatic constitution in other words are evidence only of a lymphatism Clute and Smith (o) on the other hand believe that these cell collections are exidence of a mild inflam mators process. In con idening the relation ship of the e cell collections and Graves disease they ob erved no evidence of these cell nests in so many toxic goiters that they feel that there is no relationship between this cellular inflammatory reaction and the glandular hypertrophy and associated in creased metabolism

The etiology and climical significance of these cell nests is a problem one authority munitams that they are part of a general lymphatism while another maintains that they are due to a chronic inflammation. A third consideration might be that these are undifferentiated cells such as occur in the breast and which on proper physiological stimulation spring into activity and form acmi

CLINICAL OCCURPENCE

Acute thyroiditis occurs most commonly in the female sex Robertson (33) reported 52 females and 32 males in 96 cases I found in 67 cases 47 females and 20 males. The age occurrence varies from 18 months to 77 years the oldest being my own patient. Table I shows the age occurrence in 65 cases.

TABLE I --- AGE OF PATIENTS AT TIME

	OF OCC	URRENCE	
Ag V A	N f	Ag V	N t
1-10	•	50-60	11
10-20	7	60-70	4
20-30	14	70-80	2
30-40	14		_
40-50	11	Total	65

Robertson (33) found in his 96 cases that the age of greatest frequency was the same as that shown in Table I (between 20 and 40

years)

The relationship between goiter and acute Some authors thyroiditis is interesting believe that acute thyroiditis occurs only in previously diseased glands Hagenbuch (16) reported 43 cases of which only 5 had Loiter 32 of Robertson s (33) 96 cases had gotter and 32 of my 67 cases suffered from gotter previous to the acute infection 24 of these 32 were adenomatous in type 3 showed general hyperplasm and 5 were unclassified Seven of the cases I studied showed toxic gotter symptoms during the acute infection one of these reported by Rogers (34) suffered a postinfection thyrotoxicosis one reported by Greenberg (14) who had suffered a severe thyrotoxicosis previous to the infection re covered from the toxic state after the infec tion although part of the gland was resected at the operation performed and this might account for the recovery one individual studied by Weeks (46) developed severe myxo.dema after a drainage operation from which she recovered only after the wound sinus closed of the remaining 63 cases 10 showed no postoperative thyroid disturbances and 53 were unclassified

The etological factors in acute thy roidits are numerous. Trauma to the gland produced a severe attrick of thy roiditis in a case reported by Link (26). The patient had a toxic goiter which was treated by a rubber. An acute thy roiditis developed and at operation the gland was found to be a ventable carbuncle. Drunge was instituted but the patient succumbed. Puncture wounds with infection

of the thyroid were observed during the World War Aside from the direct triuma infection may occur in four ways

z By extension through a persistent

thyroglossal duct

2 By direct invasion from contiguous structures Cleland (8) performed an autopsy on a patient who had purulent perichondritis of the tracheal cartilages with extension of the

suppuration to the thyroid

3 By lymphatic metastases That infec tion reaches the thyroid through the lym phatics is a debatable point. So many infec tions occur after pharyngitis tonsillitis and other upper respiratory infections with the associated lymphidenitis that it seems prob able that organisms do reach the thyroid in this manner The natural lymphatic current flows from the thyroid gland to the deep cervical lymph glands but with the clogging of these natural channels following severe infection in their regions of drainage the natural drift may be stopped or even reversed and organisms be carried to the gland my series of cases 13 followed upper respir atory infections such as pharyngitis or tonsilli tis i followed multiple ulceration of the tongue I followed quinsy and I followed mastorditis Robertson had a cases following tonsilitis and 4 cases following diphtheria Hagenbuch had 6 cases complicating Vin cent s angina a complicating tooth extraction and meningitis and 3 cases following acute upper respiratory infections

4 By blood stream metastases This is the most common mode of infection thyroiditis in my series complicated typhoid fever 5 times pneumonia o times empyema once influenza 8 times erysipelas 3 times puerperal septicemia 13 times and multiple suppurative arthritis once Robertson had 7 cases following acute rheumatic fever 6 cases following pneumonia 6 following acute enteric fever 4 following erysipelas 4 following influ enza 4 following puerperal sepsis and 4 fol lowing malaria Hagenbuch reported 8 cases following influenza and 9 following pneumo nin Metastases by the blood stream is the most logical and only adequate explanation for the development of acute thyroiditis as a

complication of these maladies

The bacteria involved in infection of the thyroid are numerous. In 63 cises in which suppuration occurred the organisms isolated were typhoid in 2 cases, paratyphoid A in case paratyphoid B in 1 case pneumococcus in 3 cises streptococcus in 10 cases staphylococcus in 7 cases streptococcus and staphylococcus in cases and staphylococcus and staphylococcus and staphylococcus in cases are cases and staphylococcus in cases are cases and cases are cases and cases are cases and cases are cases ar

Robert on obtained cultures from 7 of the at suppurating cases and found pneumococcus in 4 circle typhoid in circle and streptococcus in 1 case.

Briggs and Scribner (\$) found 17 cases of typhoid thyroiditis be ides their own case which was due to the typhoid bacillus the organism being isolated in pure culture from the absects cavity.

In addition Osler and McCrae (30) state that acute thy roiditis may occur in the course of smallpox measles scarlet fever and mumps Epidemics among children and among soldiers have been reported

LLINICAL SYMPTOMATOLOGY

The onset of acute thyroiditis is usually sudden. The first symptom in 7 of the cises studied was pain in the neck over the thyroid gland. It is lancinating in type and may radiate to the mastoid region or the ear. The pain is aggravated by extension of the head because the muscles and heavy fascia compres the swollen tender gland when the chin is elevated and as a result the patient holds the head in a bowed position.

Swelling or timor formation over the thyroid was the first symptom observed in 25 of the 67 cases. This swelling may involve one lobe or both lob. Or the whole thyroid gland may stand out in relid. The swelling may extend from the chin to the minibrium and the chin may be drawn to the diseased side by the inflammatory distention of the cervical tissue. In cases of adenomata the cumors swell ripidly while the remaining portion of the gland may show no increase whatsoever in sile.

Fenderness over the thyroid gland was pre ent in 63 of the 67 cases and in 4 cases this was the first complaint. The tenderness was exquisite in 10 of the cases Chills and fever initiated the disease in 20 of the cases Fifty seven of the patients had fever which ranged from 99 to 104 degrees. The temperature tends toward the saw tooth type especially when an abscess forms in the gland.

Coughing occurred in 10 of the cases It is spasmodic in type and is usually a harsh dry non productive hacking Occasionally mucus and blood stained sputum is rai ed Brenzier (4) reports the case of a man who had an abscess which evacuated into the larvax so that a gr at quantity of pus and slow hing to sue was expectorated. Gemenez and Zapiola (14) had a similar patient whose absce s ruptured spontaneou ly into the trachea and who coughed up a great quantity of pus Ribattu and Gillard (31) and Thesen (38) reported case with spontaneous evacua tion into the larvny accompanied by a cough and expectoration of purulent fluid

Hoarseness vas mentioned in z of the cases. This is due to cedema swelling and venous congestion of the lary ngeal mucous membrane. Complete aphonii developed in due to a cord piralvisi from pre sure on the recurrent nerve but to venous congestion and ordema the lutter occurring in the supra glottic or infraglottic region and not in the cords themselve.

Dispince developed in 32 of the case sometime in the cour e of the di ea e and in one case has the first symptom. It I due to welling and ordema of the tracheal epithelium and to compression and di placement of the air passage by the abserse. Choking occurred in 7 of the cases 2 were relieved by tracheot ome incision and drunage of the abserse 3 were treated by the latter procedure while 2 ruptured spontaneously before surgical intervention was practiced.

Dysphagri was reported in 19 case in 2 of which it was the first symptom. It is due to pressure on the esophagus by the swollen gland and to edema and inflammation of the esophagus mucous membrane.

I artial ptosis with corncal an esthesia due to sympathetic nerve pressure and vomiting with a slow pulse from vagus nerve pre sure are mentioned as symptoms by Stein (37). I found neither of these recorded in the case reports that I studied

Fluctuation in event of abscess formation may or may not be present. In 26 of the cases fluctuation was obtained. The deep seated position of the cland and the heavy planes of fascia which surround and protect it make palpation for the presence of abscess formation difficult. The tumor often imparts a characteristic tense hard sensation to the examining finger vet there is a sensation of fluid under pressure and anterior bowing of the head to relay the overlying muscles and fascia will allow the examiner to obtain fluctuation In 34 of the 67 cases the surgeon discovered no fluctuation although free pus was found at operation In these cases there was a brawny indurated consistency due to a dema and congestion of the overlying and contiguous structures

Redness of the overlying skin occurred in 30 of the 67 cases The redness was most marked in the fluctuating adenomata 3 of which ruptured spontaneously either before the patient entered the hospital or before surgical intervention could be instituted The first 4 constitute a diagnostic quadrad Abscess formation may be determined by the pressure of fluctuation in the swollen tissue and by the temperature and leucocytosis and the general picture of toxemia which occurs when pus is present under tension in the body tissue

Toxic goiter symptoms evidenced by tachycardia nervousness tremor of hands sweating and exophthalmos developed in 7 of the cases In 3 of these a toxic goiter was present before the onset of the acute thy roid 1115

The following symptoms and signs are therefore characteristic of acute thyroiditis

- Pain over the thyroid gland
- Swelling of the thyroid gland or of an adenoma of the thyroid
 - Tenderness over the thyroid 4 Chills and fever
 - 5 Coughing

 - 6 Hoarseness and aphonia Dyspnœa
 - Dysphagra
 - Thy rotovicosis

In case abscess formation occurs two other signs develop

- 10 Fluctuation in the tumor mass
- 11 Redness of the overlying skin

DIFFERENTIAL DIAGNOSIS

Physiological hypertrophy of the thyroid at adolescence during pregnancy or during menstruation is differentiated from acute thy roiditis by the absence of pain absence of fever and the absence of marked tenderness

Hemorrhage into the thyroid gland or into an adenoma is characterized by a sudden rapid swelling and by sharp pain at the onset followed by a gradual subsidence of the pain In thyroiditis however the swelling develops less rapidly and the pain which is mild at first increases in severity

Malignancy of the thyroid has a character istic nodular hardness and the regional lymph nodes are involved early. The sudden onset the rapid growth the temperature leucocytosis which are characteristic of acute thyroiditis are not found in malignant Tenderness may be ascertained by palpation over a malignant gland late in the disease after the regional lymph glands have been involved and the capsule of the thyroid has been broken through by the malignant growth

Glossitis and abscess formation at the base of the tongue with the associated cervical ædema and swelling may resemble acute thyroiditis The latter disease is unaccompanied by any pathological changes in the floor of the mouth so that it can be ruled out by an oral examination

Bronchial and thyroglossal cysts develop suddenly when hæmorrhage or infection of their contents occur They are situated cephalad to the thyroid gland and are often present and recognized before the acute at tack develops No toxic goiter symptoms result from an infection in a bronchial or thyroglossal cyst If the pyramidal lobe of the thyroid is involved alone as already mentioned differentiation from an infection in a thyroglossal sac may be possible only at operation

Penchondritis of the laryngeal cartilages will produce pain tenderness hoarseness

coughing and dyspinera. The lary ngeal symptoms are more marked than in acute thyroid tus there is an absence of any tumor for mation, and the lary ngoscopic examination may lead to the demonstration of the true pathology of the condition.

Cellulitis and phleamon of the neck may be difficult to differentiate from the acute thyroiditis in which the cervical structures from the mandable to the sternum are involved In cellulitis the swelling usually commences in the region of the mouth and spreads down ward while thyroiditis begins in the gland The swelling in cellulitis is more diffuse and follows the fascial planes The pain is usually not marked in cellulitis at the onset and starts at the site of the original infection while the pain of acute thyroiditis is lanci nating at the onset and begins in the gland Thyrotoxic symptoms are absent in a cervical cellulitis unle s there is an as ociated toxic gorter in which event the toricity certainly be aggravated. A diagnosis may be impossible without operation

PPOGNOSIS

The prognosis in acute thy roiditis is excel lent if the disease is recognized and treated properly Pesolution occurs in 10 to 14 days in the non suppurative type. In the suppurative type the prognosis for recovery is good but the convalescence may be long and stormy Complications such as perforation into the larynx or trachen mediastinitis pramia with secondary infection of the bursa joints and bone as occurred in my case postoperative my vordema and thy rot recosts may well nigh exhaust the patient Recurrences have been reported Vinns (4) treated a suppurative case by drunage but the infection recurred 7 years later and incision and drainage were again nece ary before complete recovery was obtained Shern (36) treated a man with acute thyroiditi of the non suppurative type who had had imilar attacks for 4 successive winters Death occurred in of Hagenbuch's (16) 47 cases In the non suppurating cases 2 of 55 patients died and in the suppurating type 9 of the 41 died making a total of 11 deaths in the 96 cases r ported by Robertson (33) In my series of 67 cases 11 patients died and 56 recovered making a death total of 24 in 10 or a mortality rate of 11 4 per cent

TRE ATMENT

The general treatment in acute thy roiditis is directed toward relief of the general malaise chills and fever headache sleeplessness and Ice caps to the head coat far antipyretics codeine or morphine if the pain is very severe saline cuthartics in doses sufficient to produce a good daily bowel movement and tenid sponges in event that the temperature nses over 10 degrees are helpful. A hould diet is necessary in some cases because of the disphagia and in such an event nourishment should be given every hours during the day Autritious drinks uch as cocoa egg nogs well sweetened orange juice and milk are preferable. If the patient does not suffer from dysphagia a regular house diet supplemented with mid morning and afternoon feedings is best In specific inflammations specific cura tive measures are indicated. Typhoid vaccine pneumococcus serum and meningococcus serum have been used in thyroiditis complicating typhoid pneumonia and meningitis

The local treatment in acute non suppurative thy roddits consists in the application of oold or heat. Ice packs during the stage of enlargement and orderna that is during the first 4 to 48 hours are used in an effort to limit congestion. Dry heat is then applied to hasten resolution. If ice packing allays the pain better than heat it should be used as

long as it is efficacious

If suppuration ensues in spite of treatment as it did in 30 of Hagenbuch's 43 cases in 40 of Robertson's of cases in 63 of my 67 cases prompt incision and drainage is the best treatment Delayed resolution with persist ence of the symptoms of toxemia beyond the 10 to 14 day period an irregular fever increase in the pain steady increase in the size of the tumor with the associated pres sure symptoms indicate abscess formation Fluctuation may be a certained but this is not essential for a diagnosis because the heavy fascue swelling and ordema of the contiguous parts can mask suppuration in the thyroid gland very easily Large monolocular or multilocular abscesses require incision and

drainage Various incisions have been made such as vertical ancisions in the midline incisions along the anterior border of the sternocleidomastoid muscle in the presence of unilateral swellings and incisions made trans versely over the most dependent area of the swelling but the best approach is secured by a collar incision through the skin and platy sma The intermuscular fascia is then split longitudinally and the sternohvoid and sternothyroid muscles are retracted laterally on either side until exposure of the inflamed gland is obtained Lahey (4) believes that the ribbon muscles should be severed on either side through part of their width at least so that the longitudinal incision in the inter muscular fascia will gape and promote free drainage After the abscess has been exposed it is opened widely if rupture has not already occurred during the operation. The cavity is then sponged out gently Although many surgeons favor curetting the walls this method is contraindicated because blood vessels may be opened and dangerous hamor rhage result Mosetig (20) reports such a case of fatal postoperative hymorrhage Drainage is best insured by a good sized hard rubber tube The tube may have multiple perfora tions cut along its sides and may be split part of its length the two split pieces being separated when the tube is placed one piece going to each pole of the infected lobe so that free drainage is insured from the most remote areas after collapse of the abscess wall occurs In case both lobes of the thyroid have suppur ated two such tubes should be used

In the cases of multiple miliary abscess formation in the gland subtotal thyroidec tomy has been practiced. This is a dangerous type of infection Schwer (35) reports two fatal cases Links (26) patient died but Greenberg s (14) recovered giving a mor tality of 7, per cent in the cases that I studied

In the presence of suppuration in a single adenoma Vianny (42) practiced strumectomy of the abscessed adenoma in a cises drained and performed a secondary strumectomy in 2 cases and executed a simple incision in one case Clute and Smith (9) believe that the abscessed adenoma should be removed if the local and general condition of the patient will

permit The more conservative procedure of incision and drainage with secondary strumed tomy after the acute attack subsides appeals to me as based on sound surgical principles

SUMMARY

- 1 Acute thyroiditis occurs often enough so that the members of the medical profession should be cognizant of its existence as a clinical entity
- Acute thyroiditis is characterized by a quadrad of symptoms (1) Dain over the thyroid (2) swelling or tumor formation over the thyroid (3) tenderness over the gland and (4) fever
- 3 Conservative measures are indicated in the non suppurative variety always indicated in event of suppuration

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THE BACTERICIDAL ACTIVITY OF HEXYLRESORCINOL (SOLUTION S T 37) ON WOUND SURFACES

BY WILLIAM A FLIRER SCD AND VEADER LEONARD M.D. F.A.C.S. BALTIMORE fR er Lev School fillween AP M 11 th Th 11 nk II

HE bactericidal activity of hexylresor cinol in alycerine has been previously described (2) Certain experiments by the writers which have led to the selection of hexylresorcinol in 30 per cent aqueous gly c erine (solution 5 I 37) as the solution best suited for the purposes of general antisensis have been reported in a previous communication (3)

The purpose of the present article is to describe a simple technique by which the suit ability of any given germicide for use as a prophylactic against infection in accidental or operative wounds may be readily de termined and to describe the results obtained in the rapid disinfection of experimentally infected wounds with solution S T 37

In the first place most germicides suffer a marked loss in bactericidal activity in the presence of organic matter which is of course pre ent in every wound and on all mucous surfaces In the case of certain types of ger micides this loss of bactericidal power may be practically complete in the presence of 3 per cent of organic matter (per cent of pep tone and 1 per cent of gelatin) which is the standard adopted by the U S Hygienic Laboratory (1) Such germicides are ob viously unsuitable as prophylactic agents It would appear to be logical therefore to test a given germicide in the presence of the standard concentration of organic matter before proceeding to any actual experiments on wounds and to determine this activity not only in the standard peptone gelatin mixture but also in the same concentration of normal serum and of whole blood as well for the reason that this is the particular type of organic matter met with under practical con ditions in wound disinfection

The bactericidal activity of solution S T 37 in the presence of 3 per cent peptone gel atin blood serum and whole blood is shown in Table 1 These experiments were conducted at 3, degrees C 5 cubic centimeter amounts of solution S T 37 containing the requisite quantity of organic matter being inoculated with one standard 3 millimeter loopful of a 24 hour filtered broth culture of the test organism the same inoculum being trans ferred to 10 cubic centimeters of fresh beef infusion broth at each of the time intervals indicated and the tube then incubated for 48 bours

The test organisms and the time intervals chosen for these experiments are the same as those employed in the tests on wound disin fection described below As shown in the table solution S T 37 was found to be com pletely effective in a minute against each of the four test organisms in the presence of the standard concentration of peptone gelatin solution normal horse scrum and citrated rabbit s blood

RAPID DISINFFICTION OF FAIRMENTALLY INFECTED WOUNDS WITH HE VYLRESONCINGL (SOLUTION S T 37)

In the technique to be described an attempt has been made to standardize controllable

FABLE I — THE BACTERICIDAL ACTIVITY OF SOLUTION ST 37 INTHE PRESENCE OF THREE PER CF NT ORCANIC MATTER (U S BYGIENIC I ADDRATOR'S STANDARD)

FFIRTR AND I FONARD

0 m t	lig m	1 m	L		
		m	m	S m	1 1
I It ne Lelatin	Stapł ylococcus aureus	0	0	0	+
	Streptococcu viridans	0	0	0	+
	Streptococcus hemolyticus	0	0	0	+
- 3	Bacillus coli	0	0	0	+
Vormal horse erun	Star hylococcus	0	0	0	+
	Streptococcus iridan	0	0	0	+
	Streptoco cus hemolyticus	0	0	0	+
1	liacillus coli	0	0	0	+
(itrated rabbit blood	Staphy lococc is aureus	0	0	0	+
	Streptococcus vi idans	0	0	0	+
	Strepto occus hæmolyticus	0	0	0	+
	Bac llus ccl	0	0	0	+

conditions with a view to developing a simple but dependable method by which the suit ibility of a given germicide for use as a prophylactic agent in fresh wounds might be readily determined in any laboratory. Such considerations as trauma as by crushing and the presence of foreign material in the wound ire not considered in this technique for the reason that they cannot be readily standardized. The method merely represents a test under standard conditions by which the efficiency of a given germicide to disinfect a wound surface within a given time may be determined.

Selection of test organisms Staphylococcus aureus was solected as a test organism not only because it is commonly responsible for wound infection but also because it is gen erally considered to be the most resistant of the progreme cocci to disinfection by chem ical means Streptococcus viridans and streptococcus hemoly ficus were included because of the frequency and the seriousness of wound infection by these organisms Braillus coli was chosen to represent the Grim negative organisms because of its resistance to chemical hisinfection and because it is not infrequently responsible for wound infection

ifedia and preparation of cultures Staphy lococcus aureus and bacilius coli were truss ferred daily in standard peptone (Armour's) broth of pH o 6-6 8 while the two strep tococcus cultures were transferred daily in fresh becf infusion broth (pH 66-68) until luxuriant growth appeared on 24 hours incubition. Thereafter all cultures were transferred daily in the respective media and fresh 24 hour cultures in ariably used in the tests

Preparation of bacterial suspensions for aound moculation The day before the wound experiments were to be made the number of organisms in the 24 hour broth culture to be used was determined by plating out in fresh beef infusion agar I cubic centimeter of each of a series of dilutions in physiological saline solution After 24 hours incubation of the plates at 37 degrees C the colonies were counted and the broth culture which had meantime been stored in the ice box at degrees C was then diluted with the calcu lated quantity of physiological saline solution to give a suspension containing 200 000 organisms per cubic centimeter. The counts were checked once or twice for each culture after 24 hours storage in the ice box and were never found to vary to any considerable degree A suspension containing organisms per cubic centimeter was chosen for the reason that o 5 cubic centimeter of fluid was found to cover completely the entire wound surface employed This inoculum con trined therefore 100 000 organisms evenly distributed over the wound surface-a figure which was selected arbitrarily but which it was felt represented an moculum well above the average accidental infection

Preparation of the animal Guinea pios were used exclusively in these experiments. The pig being held by an assistant the him was first removed from the abdomen with ordinary clippers and the entire abdomen



shive I. Lither was then admin tere I and the pige curely tred down on in ordning wire test tube rich as for a lap arytomy. The skin of the abdomen was throughly wiped on with a terile ginze or cotton sponge atturated with solution 5.1.7 and a fir herile ginze sponge siturated with the olution placed over the operative field where it was illowed to remain about a minute.

A trian ular kin flap with the upper angle in the mid line about to sentimeters below the viphoid proces we next laid back to expose a tringular area of the anterior abdominal fiscia measuring about one inch along each side.

Il ound inoculation. One half cubic centimeter of the suspen ion of the te t organism entaining, ibbut reo ood virbl organism will haved to flow into the wound from a terile graduited pipette, e in distribution of the miteral over the wound surface, being, ficilitated with the point of the pipette, when nice ary

First control A terile swab constain, of the ordinary wooden application stick with an ab orbent cotton end and sterilized in in individual test tube wa then stroked over the wound surface and the initerial transterred to the surface of a plain agar or blood agar plate depending on the organism used This constituted the fir t control to prove the virbility of the organism on the media used and also that the moculation had in fact been made as intended

Second control A Laure sponge saturated with solution 5 1 3, wh then placed over the wound covering the entire wound surface Thirty seconds later the sponge was lifted and the wound surface stroked with a sterile cot ton swab hich is then dibbed in the siline suspension of the orginism and the mate rul transferred to the surface of an again plate. The constituted the econd control and cover a point ldom controlled in ex periments of the kind-namely the pothility of transferring sufficient germicide or the culture swib to prevent the growth of any veible organi m which may have been trans terred with it. The appearance of growth in the second control plate rule out the poibility of eich in occurrence in the wound culture taken subsequently

Hound cultures At the expiration of courtly one two and nive minutes after application of the germende the guaze pone of lifted a terrile with troked over the wound inface and then tran ferred to the urface of an item plant. This is illustrated

In the transference of the material remove, by the swith to the surface of the mar plate the same procedure is na arrably followed the swith is stroked rapidly back and forth doing one di uneter the swith meantime being ratified in the fangers of the right hand with a twisting motion and the plate gradually being rotted with the left hand until one complete resolution had been made. In bring, every portion of the urface of the will into direct contract with the mar and distribute the material evenly over the urface of the plate.

All plate were incubated for 48 hours it 37 degrees C before the re ult were recorded

This experiment was repeated three time with each of the four fit organisms. Is hown in Table II the fit and second controls showed satisfactors growth in ever case while in no case did solution S. I. 3, ful to effect complete disinfection of the wound surface within 1 minute. The uppear ince of

_		KCINOL (SOLCIE	J 1 3 I	311		_	
. 1			100	CEL	W J lt		
1	1	Ttgm	g m	g m	m	m	5m
	1	Staphylococcu aureus	+	+	0	0	0
		Staphy lococcu nureus	+	+	0	0	0
_	3	Stapl ylococcu aureus	+	+	0	0	0
-	4	Streptococcu 111da 15	+	+	0	0	0
	5	Streptococcus iridans	+	+	0	0	0
	6	Streptococcus viridans	+	+	0	0	0
		Street tococcus hemoly ticus	+	+	0	0	0
	8	Streptoccecus 1 mmolyt cus	+	+	0	0	0
	9	Streptococcus hamoly ticus	+	+	0	0	0
-	10	Bacillus coli	+	+	0	0	00
-	11	Bacillus coli	+	+	0	0	0
_	12	Bacillus coli	E	+	0	0	0

The transfer of the transfer o

the control plates and one minute plates is shown in Figure

The standardized technique described takes no account of wound infection by spores. The actual destruction of ordinarily resistant spores on tissue surfaces without tissue de struction is almost inconceivable to one funding with the extraordinary resistance shown by these bodies to disinfection by chemical menus in spite of reports to the contrary occasionally appearing in clinical literature. In the experiments upon which these reports are based the fact is almost invariably overlooked that the presence of extremely minute quantities of almost any germicide or antiseptic transferred to the culture medium with viable spores will completely prevent their germination.

Spores in themselves can do no harm since germination of the spore is an essential



Fig Appearance of control plates and wound culture plates Toj row staphylococcus aureus bottom roy streptococcus l'amolyticus

In each row the flate at the left (first control) shows the result of the wound culture taken before application of the sermede. The growth shown on the middle plate (see ond control) from a flat insufficient germicide a transferred on the culture s vab to p event growth of the organi ms. The stenle plates at the in this each row show the result of the wound ultures taken i minute after application of the germicide.

preliminary to bacterial activity. Fortunately then the problem of prophylaxis in accidental wounds which may contain spores in the in fectious material present resolves itself as far as the spores are concerned into that of pre venting their germination. The complete prevention of germination (sporostasis) by mi nute quantities of antiseptics or germicides bears no relation whatever to the resistance of the spore to disinfection. For example, the stock strain of bacillus subtilis carried in this laboratory produces spores which survive boiling for 30 minutes and exposure to a saturated aqueous solution of phenol for 30 minutes yet the presence of hexylresorcinol in so minute a concentration as 1 60 000 completely prevents the germination of these spores under conditions which otherwise result in prompt and luxuriant growth

In general it may be considered that the problem of efficient wound prophyl trus is that of promptly killing off vegetative contain nants and of leaving enough of the prophylactic igent in the wound to prevent the germination of spores. A point which one finds but seldom discussed in the large literature on this subject is the fact that moisture may be under ordinary circumstances ab solutely essential to disinfection by chemical

means. To be really effective the germicide hould be present in solution Germicide which evapor ite rapidly such as tincture of unding may be very logically suspected of exerting only a very tran tent bactericidal action on tissue surface Whether or not bactericidal activity continue after evapo rition through the deposit of the olid con to tuents of the solution in the tis ue moisture and in straned to sue as a highly contro ver ral point and little evidence of experi mental nature can be offered for one or the other view Consideration of this point how ever lead one mevitibly to the conclusion that in the absence of atisfactors proof the afe t method of applying a prophylactic

agent would appear to be by means of wet dressings or at least by means of a solution which evaporates slowly

The simple method described in detail above is presented as one which may be employed in any bacteriological laboratory to determine under standard conditions the suitability of my preparation as a prophylac tic agent for wounds

RIFILINCLS

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THE SURGICAL TREATMENT OF GASTRIC AND DUODENAL ULCFR

BY HENRY W LOURIA M.D. BROOFLYN \CW YORK.
F mth S gctS fP fH v Hab L d k L h G A

O problem in the borderline between medicine and surger discussion and divergent opinion than has the subject of gastric and duodenal ulcer In spite of extensive pathological studies of both clinical and experimental material the pathosenesis of gastroduodenal ulceration re mains a matter of conjecture and debate. The indications for and the results of medical and surgical therapy are similarly topics extensive ly discussed Turthermore the surgical pro fession is by no means united in its opinions with regard to the operative methods to be employed In the absence of concrete proof of the etiology of ulcer it is apparent that the value of surgical procedures in their ultimate analysis must rest upon the permanent results achieved and not upon a theoretical considera tion of possible causative factors

Notwithstanding the deficiencies in our knowledge of gastroduodenal ulcer it must be granted that much progress has been made in the past 20 years One of the most important contributions to these advances has been the roentgenographic study of the stomach and duodenum which has not only been of the greatest assistance in the precise diagnosis of gastroduodenal ulcer but it has added im measurably to our concept of the physiology of the stomach and the effect of surgical pro cedures Operative methods of all types have been employed in great number and their fail ure as well as their success has been enlighten ing In recent years the introduction of sub total gastric resection has afforded an unusual opportunity for studying fresh pathological specimens. One cannot but feel that the prob lem of ulcer is a many facetted one and should call for concerted study by the pathologist roentgenologist internist and surgeon. It is obvious that only through such co operation can propress be made

During the past year the writer has had the privilege of serving as a voluntary assistant to Professor von Haberer at the University Clime at Graz. The primity purpose of this article

is to report on a series of ulcer case—operated upon by Haberer from January 1 1925 to January 1 197 This scries was selected be cruse it represented the first group of cases operated upon by Haberer after his arrival in Criz as the successor to von Hacker. This group has the obvious disadvantage of per mitting only a short follow up period but on the other hand it epitomizes the experiences which von Haberer has gained through having performed previously over 1500 gastne resections.

HISTORICAL

Although scattered references to gastric ul cer can be found in the medical literature as far back as the year 1600 Cruy eilhier (10) in 1828 was the first to describe systematically the clinical symptoms and pathological find ings These were confirmed by Rokitansky (34) in 1839 Duodenal ulcer was described by Travers (37) in 1817 Broussais (7) in 1823 and Abercrombie (1) in 18,0 The significance of duodenal ulcer was overlooked however until the decade 1000 to 1010 when its impor tance and frequency were emphasized by the writings of Moynihan (24) and W. J. Maro (22) With the advent of improved roentgeno graphic methods of gastro intestinal diagnosis the differentiation of gastric and duoden il ulcers was greatly simplified

Present day gastric surgery began with the experimental researches of Gussenbauer and von Uninwarter (13) which were undertaken in Vienna in 1875. They successfully per formed gastric resections on dogs at the sug gestion of Billroth who was considering the feasibility of a similar procedure in the radical treatment of pyloric circinoma. It is interest ing to note in passing, the seemingly prophetic words of Gussenbauer who stated in 1876 that gastric resection might be as useful in the therapy of gastric ulcer as in the treatment of gastric carnoma.

The success of the experimental studies of Gussenbauer and von Winiwarter led Pean

(o) in 1579 to attempt the first 1 1 tric TC CC tion on a patient suffering from an true carca The stomach and duodenum were united end to end after partial do ure of the upper halt of the cut end of the tomach The patient died of peritonitis on the tith Inutter operation I vdvgier (,) in > 80 made i imilar attempt in a cale of caltric circi name but was likeweening need toll. The fir t ucce fulga tric relection in record was pertormed by Billroth (5) in 1851 on 1 woman with in extensive pyloric caremoma tomach and duodenum were united and to and and the method of a citric resection a now cuerally known to the Billroth Lalthough in France it is often referre Lt. a. the Lean open

Woelfler (g) in 1851 at the in ge tion of hi triend Nikiloid in pert rimed an autorio gi tro enterost imm on a ci e of in opperable gi troe circuman with palorie b truction. It title lid he think that the procedure we to be the found fatinitie lid he to occurrence 100 tril fen of the trin ver e old in ther Wielfler tech inque led Courses per 1912 in get brin inghet led Courses per 1913 in get brin in ket led pt 1919 inquinitin through a lit in the trin ver e me old in and turning it is the anterior will of the trimed. In 185 won Hicker 160 citred at the lir by terior ga tro enter 1 time and with minor in direction that it contails the perfettion reformed to day.

Death tollewing the Billroth I method in the receion led to the behief that the method entitled undue tensi in on the suture.

table hing the end to end gastroduodenal unst mo is indit wis therefore suget of that the toma h and diodenum be closed bin ills in it the continuity of the gastro intendit refer e triblished by a gastrogum si my. In operation ha been the sulject to many modifications the mest important of which were suggested by Kroenlein (21). Virkulez (3). Hotmer ter (1/2) Tolya (1). Since the underlying principle remain in changed the operation, hould be termed the Billroth II.

Doven (11) in 1895 propo ed that g1 tro enterostomy should not be restricted 1s it had been hitherto to cases f pylone ulcar but that it should be employed in all cases of duodend ulcer's sociated with severe pain and hypercadity. He argued that theese supposs were due to spasm of the pylorus and that procedure. The following years compared the golden era for a strongeneration grew rapidly in popularity and for some time was even employed in cases which presented only at the vinited only at

It was not long before surgeons began to be cenfronted with unfavorable regults after gas tro entero tima for ulcer I ersistence of symptoms often in exaggerated form was not uncommon particularly in cales of gastric ulcer Furthermore in tances were reported it hemorrhice perforition and malignant k_encrition of 11 trie ulcer and compelled surgeons to reast to other method than im 1 le f istro entero tomy Riedel (33) and lavr (a) performed leave rejections of the stom ich lewing the pylorus intact I i el berg (i) proposed occlu ion of the nylorus by dividing the antrum palors and then performing a pos terior ca tro enterostomy but this led to a relatively high percentage of jejunal ulcers I mally since this extensive gastric resections have been employed in care of both gastric and duodenal ulcer Billroth I has been rec ommended chiefly by Haberer whereas other urgeon have favored variou modifications of the Billrath II

LATRIOUENESIS

Numerous theorie have been advanced to explain the development of ulter but all of them have as their tarting point certain recepted chincil and pathological data which they cek to explain by an inductive method. Withough the chories beek chincil and can take proof their consideration is none the less valurable in relation to the empirical facts of ulcer surg ry.

Before passing on to a discussion of ulcer theories at is desirable to review briefly a few important facts with regard to the anatomy and physiology of the stomach. The tomach h is been arbitrarily divided in many was by different authors but in this report the well known Holznecht classification into pars py lorica pars media and pars cardiaca will be employed The pars pylorica is the motor por tion of the stomach hence the term pars eges toria The pars media and cardinca constitute the digestive part of the stomach thus giving rise to the term pars digestoria. Histologically the mucous membrane of the pars pylorica is characterized by its mucous glands whereas the reid and peptic cells are found in the parmedia and cardinca. The pylonic glands extend further upward on the lesser curvature than they do on the greater curvature. That portion of the lesser curvature which extends from the pars cardiaca to the pars pylonica constitutes the magenstrasse of Wildever Here the mucous membrane is stretched tight ly over the underlying structures in contrast to the loose folds of mucosa which are found along the greater curvature and in the pars cardiaca. The blood supply of the stomach is munly furnished by four preat arteries al though the pars cardinea receives several branches through the vasa brevia. There is no doubt that the blood supply of the lesser curvature is less than that of the greater curva ture and that the least vascular area of the lesser curvature corresponds to the pars media where the terminal branches of the pyloric irtery and gastric artery anastomose irterioles supplying the fastric mucosa are end arteries and their occlusion therefore results in i conical infarction of the mucous membrane

Two phases of gastric secretion are commonly recognized the primary or psychie and the secondary or chemical The first is de pendent upon stimuli arising from the thought and the sight of food mastication and deglu tition The second phase is chemical and de pends upon the contact of food with the py lone mucous membrane. It is assumed that the control of acid secretion by the pyloric alands is a nervous mechanism although this assumption lacks physiological proof. At all event re ection of the lesser curvature and districtive thirds of the stomach as performed in the radical treatment of ulcer results in either a complete absence or great dimunition of the free hydrochloric acid content of the

gastric tuice. This change occurs even though many acid cells remain in the proximal part of the stomach

As Cruveilhier pointed out the defects of curring in the normal continuity of the stom nch may be divided into two forms the ero sion which is a superficial mucosal defect and the ulcer which extends into the deeper layers Aschotf has emphasized the necessity of scoiriting these two types in considering the pathogenesis of ulcer and most writers are in accord with this view Aschoff (2) has conveniently classified the erosions of the stomach into two groups. The first form occurs chiefly along the greater curvature in the pars media and pars cardiaca. The crosions are extremely small and numerous they are barely visible to the naked eye and are characterized by a tendency to heal Gastric erosions of the sec ond type are considerably larger and occur in smaller number along the magenstrasse contrasted with the former group they are deeper and heal more slowly

It is beyond the limits of this article to de scribe fully the many explanations which have been advanced for the pathogenesis of gastric crosions The earliest theory was suggested by Virchow (38) who thought that they were duc to organie changes in the blood vessels. Von Bergmann (4) has maintained that due to dis turbances in the vegetative nervous system the blood vessels of the gastric mucosa under go spasmodic contraction leading to areas of anomic infarction Other investigators have called attention to the presence of intestinal epithelium in the gastric mucosa and suggest that these islands of aberrant intestinal epi thehum have a lowered resistance to the diges tive action of gastric terments. Konjetzny und Pull (o) behave that the occurrence of has tric erosions is dependent upon inflammatory changes in the gastrie mucosa and that the crosions are the product of a diffuse gastriti I mally there is a small group of workers who feel that the crossons are the result of pure mechanical trauma. Irre pective of how the vergent these theories are it must be stated that they have one common factor namely that the actual destruction of the gastric mu cosa is the re ult of digestion by fastric fer ments

(o) in 1870 to attempt the fir tan in the ec tion on a patient suffering from at the circi The stomach and duadenum were united end to end after partial cl ure of the upper half of the cut end of the tomach The patient dued of peritority on the tifth day ifter operation Inductor (ss) in 1850 mide 1 imilar attempt in a case of £1 tric care noma but wa likewise un ucce ful. The fir t succe tul gastric resection in record was pur tormed by Billroth () in 1851 in a woman with in extinive ful recording matomach and duo lenum were united and to end and the method of gateriere terms now controlly known as the Billy th I although in Ir incests often referred to a the Lean oper

Woelfter (g) in 1884 at the unset it it is his first limited. Nik shall in pertirine I in interior as the interior time in 1884 at the operation in 1884 at united who the fundation for the most common as the conjugate in 1884 at united who the fundation for the most common as the conjugate in 1884 at united who the interior in 1884 at united with interior time in 1884 at united i

Death 101 wing the Billroth I methal at a tric re ceti n led to the belief that the metho l entailed undue ten ion on the suture ctibli hing the end to nd an it durden il in it mot and it was therefore supposte! that the temach and duo lemm be closed blin lly and the continuity of the gy tro intefind truct re c tablished by a gr trojejuno (my The operation has been the sulpert of miny modifications the most important (t which were sugge ted by Kroenlan () Mi kuli z () Hofmeister (), 1 Polya ()) Reichel (3) Movnihan (5) and Biliour (3) Since the underlying principle remains un changed the operation should be termed the Billroth II

Doyen (11) in 1893 proposed that gistro entero tomy hould not be restricted as it had been hithertos to cases of pyloric ulcer but that it should be employed in all case of dioden il ulcar associated with severe pain and hipper cichty. He argued that these symptoms were due to spasm of the pylorus and that procedure. The following years compared the goldeners for 32 to enterostom. The operation are republy in popularity and for some time was even employed in cases which presented only 51 treatments but no positive finding. In the latter group the functional result were diagrams and notes it tied secondary operation for the disen agement of the 1 tro enterostomy stores.

It will not long before surgeons began to be confronted with unfavorable results after gas tro enterg toms for ulcer 1 ersistence of s mptoms often in existerated form was not uncommon particularly in cases of gastric ulcer Furthermore instances were reported of hymorrhype perforation and malignant k-corration of a istric ulcer and compelled urreens to re art to other method than am plega tro entero tomy I redel (54) and Pasr (o) performed leave resection of the stom ach leaving the pyloru intact Liselsberg (1) propo ed ecclit ion of the pylorus by dividin the antrum pylon and then performing a pos ten r sa trounters toms but this led to a relatively high percentage of jejunal ulcers Finally since to a exten is egastric rejections have been employed in each of both gastric and dupdenal ulcer Billroth I has been recommended chiefly by Haberet whereas other surgeon has a favored various modifications of the Billroth II

I MIROCI NESIS

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The pathogenesis of gastroduodenal ulcer is obviously of greater clinical importance than the origin of gastric erosions. As regard, the relation of erosion to ulcer at cannot be denied that the primary stage of ulcer is necess trily a uperficial defect in the mucous membrane In fact Konjetzny and Puhl ha e argued that crosions are simply a stage in the de elopment of ulcer As pointed out by Orator and Metz ler (8) this conception is reflited by the fact that in their researches only 26 per cent of the gastric ulcers and 18 per cent of the duodenal ulcers were accompanied by La true erosions Furthermore they found erosions in cases of primary gastrocarcinoma a well as in ca es of gastroptosis and antrum gastritis \schoff () has maintained that the frequency of ulcers in the region of the lesser curvature is due to the fact that erosions of the magenstrasse are con tinually exposed to hoth chemical and me chanical insult This theory fails to explain the occasional occurrence of ulcers near the greater curvature. Von Bergmann is of the opinion that the same neurogenic factors which cause gastric erosions also lead to ulcer formation and calls attention to the frequency

The disappointing feature of studies in ga troduodenal ulcer has been the fulure to pro duce experimentally the clinical equivalent of a chronic ulcer Gastric erosions and catarrh have been produced by injection of the gastric vessels with lycopodium by electrical irrita tion of the vagus nerves and by administra tion of picrotoxin and pilocarpin However the le ions have always been superficial and characterized by a marked tendency toward rapid healing. These experiments are never theless of intere t in demonstrating that path ological changes in the stomach may be in duced by different methods. They coincide with the view expressed by Orator and Mctz ler that the various theories of ulcer are not necessarily contradictory but can be made to accord with the empirical facts of uleer surgery

of vegetative stigmath in ulcer patients and their tendency to vasomotor instability

PATHOLOGA

One of the most interesting features of the pathology of gastroduodenal ulcer is a study of site of predilection. Of the 81 cares of gas true ulcer the lesion in 77 cases was found in the pars medin. In 44 of these cases the lesion was located on the lesser curvature in 30 on the posterior will and in 3 on the anterior wall. There were 4 instance of ulcer of the pars pylonen.

The duodenal ulcers were di tributed in cir cular fashion around the fir t portion of the duodenum as a rule within centimiters of the pyloru In 54 per cent of the care the ulcers were multiple. This was particularly true of the ulcers of the anterior wall which were associated with posterior wall ulcers in 78 per cent of the cases In many instances the ul cers which were found along the lesser curvature of the duodenum extended along the anterior and posterior walls of the duodenum in saddle The cases of pyloric steno is were invariably due to cicatricial contraction of the duodenum resulting from the healing of con fluent duodenal ulcers | there were no ulcer in the infrapapillary portion of the duodenum

Since in 17 cases there were ulcers in both the atomach and duodenum a single etiolo too both gastre and duodeneal ulcer was there fore suggested. The position of the e ulcer differed in no wise from those previously described.

In to cales the jejunal ulters were ituated as described by Chitat (8) along the melentate border of the jejunum at a point opposite the galtro enterostomy toma. In 6 cases the ulter was in the efferent loop and in 4 case in the afferent loop.

In addition to the findings in the stomach and duodenum the perigastric change were also of considerable importance Practically all cases showed an enlargement of the lymph nodes along the lesser and greater curvature irrespective of whether the ulcer was in the stomach or duodenum The enlargement wa usually most marked toward the pylorus and all of the cases were associated with a certain degree of perigastritis and periduodenitis. The ulcers of the posterior wall of the stomach were frequently adherent to the pancreas in many cases there being a perforation of the base of the ulcer into the sub-trance of the prin creas The ulcers of the lesser curvature of the stomach were associated with inflammatory

changes in the gastrohepatic omentum. The ulcers of the lesser curvature of the duodenum were often accompanied by such extensive in flammatory changes in the hepatoduodenal ligament as to cause serious distortion of the common bile duct

The gall bladder was routinely examined in all cases and 7 instances of cholecystitis with cholelithiasis were found. Two cases were as sociated with gastric ulcer and 5 with duodenal ulcer Five of these patients were women and 2 were men From these findings it is hardly probable that cholecystitis bears any causal relationship to the development of ulcer

The appendix was not examined except in rare instances inasmuch as Haberer does not consider it to be of any etiological importance in the production of gastroduodenal ulcer

No instances of epigastric hernia were noted and it is not concervable that their presence could have been overlooked as a median supra umbilical incision was used in all cases

Histological studies were made of the gas tric mucous membrane in 100 cases In every instance there was an extensive inflammatory change in the mucosa of the pars pylorica whereas the mucosa of the partes media and cardinca was free from histological abnormali ties except when the section was taken from the immediate vicinity of an ulcer findings confirm the reports of Stoerk (36) Konjetzny (19) Orator (6) and others

On account of the renewed interest which the work of Konictzny has stimulated in the possible relationship of gastric erosions and gastroduodenal ulcer all specimens were ex amined for the presence of erosions immedi ately after operation As is shown in Table I erosions occurred in a considerable percentage of cases As these erosions were invariably on a background of a catarrhal gastratis the con dition is designated here as a gastritis erosiva In addition there were specimens which pre sented acute ulcerations of recent origin and this finding has been given the name of gas tritis ulcerosa

TABLE I NIGIL (a tric ulcer 68 18 13 I Duodenal ulcer 163 31 Jejunal ulcer 3

In analyzing the group of gastric ulcers asso ciated with erosions it is interesting to note that one half of the ulcers were of the non callous variety. It is of greater import, how ever that there were no instances of non callous ulcer unaccompanied by erosions or superficial ulcerations It seems plausible therefore to assume that gastric crosions are of significance in the development of non callous gastric ulcers and of secondary impor tance for the production of callous ulcers

In the groups of gastric ulcers there were 3 cases which showed malignant degeneration along the ulcer margin All of these cases were situated in the pars pylorica which in the experience of the Graz clinic is the favorite site of localization for gastric carcinoma Roentgenologically all of these cases had shown a typical niche Histologically the specimens showed the characteristic ulcer de fect in the muscularis with partial infiltration of the ulcer margin by carcinomatous cells There were no instances of malignant degen eration of duodenal or jejunal ulcer

INCIDENCE

The incidence according to age and sex is shown in Table II Among the gastric ulcers there were 10 instances of hour glass stomachs and o of these occurred in women The ma jority of patients under 30 years of age were males with duodenal ulcer

	TABL	E 11	10	GF A	ND :	EL		
Ag 3 Gast 1	0- -	0-3	30-4	40-5	\$0-6	60-7	70-8	T t
NI Fml Ttl		6	7	3		4		47 34 8
D d 11 M1 Fm1 Tt1		46 3	43	3,	5	7		47 66
Gt dd d 11 W1 Fm1 Ttl				6	3			3 4 7
J, 11 N:1 Fm1 T:1		7	1	5	3			8

SYMI COMATOLOGY

I here was nothing of unusual interest in the clinical symptoms The greater number of patients were ill for a period of over 3 years prior to operation The patients with gastric

ulcer or ulcer of the posterior wall of the duodenium showed a tendency to hematemesis and melena. There were no factors in either the habits or personal history of the patients to which an etiological significance for the production could be ascribed. Many cases presented a family history of gristra disturb ances siggestive of ulcer. One man who was operated upon for a duodenal ulcer related that his father and two brothers had been im alrily operated upon. Another male patient was operated upon for gastric ulcer in 19 6 and in the following year his two brothers, underwent similar operations at Graz.

GASTRIC ACIDITY

Gastri, acidity was determined by exam ining the stomach contents one hilf hour after a meal of ten and rolls. Although there were many cases of marked hyperacidity, this hid ing was by no means constant. As a general rule the acid content was higher in cases of duodenal ulcer than in cases of gastric ulcer Studies of the acid content of the stomach after gastric resection showed either a total absence of free hydrochloric acid or else greatly reduced house.

ROENTCEN STUDIES

Except in those in tances in which roentgen examination was contra indicated because of recent hamorrhage or the fear of impending perforation every patient was subjected to routine fluoroscopic examination after the in testion of a barium meal. Films were made only in rare cises and purely for purposes of record The presence of a niche was demon strated in 97 per cent of the cases of gastric ulcer The diagnosis of duodenal ulcer was made on the basis of persistent duodenal de formity and the presence of a niche which was found in o8 per cent of the cases In the group of jejunal ulcers which have always presented a difficult problem for roentgenological diag nosis direct evidence of the existence of in ulcer was obtained in 10 out of a total of 18

Prior to discharge all cases were relevant med fluoroscopically so that the functioning of the anastomosis could be studied and the size of the stomach observed.

TECHNIQUE

I nor to \pril 10 5 ether anasthe ia was usually employed although a small group of cases were operated upon under infiltration anasthesia of the anterior abdominal wall Since that time local and splanchnic anasthe sin have been used in practically every case except in those cases in which the presence of adhesions resulting from a previous operation made its use inadvisable. The anasthetic solu tion was a o 25 per cent solution of tutocain to which a small amount of adrenalin had been The technique used was that de scribed by Braun (6) One hundred cubic cen timeters were injected for the splanchnic anasthesia. In virtually all instances the unvesthe ia was entirely satisfactory and free from untoward results excepting a transitory drop in blood pressure. The immediate post operative effect were much better than in the patients operated upon under ether ares the 1a

In Table III the four operative methods are it ted so as to show which methods were em ployed in the various forms of uleer. Three patient with gratific uleer and four with duodenal uleer had previously undergone gastroenterostomy.

TABLE III -OILEATIVE MITHODS

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O mht	1	D i	ון 1	13,	1 T I
Bh thl		51	٥	7	
Bll thl H b		5	2	4	59
BIC th IC 1 t 1			5	3	59
Bll th III tro 1		5	•	6	6
		_	-		_
T + 1	8	61			2.5

The Billroth I method which is in yogue at Graz has been described by Orator (27). It is employed in every case in which there is sufficient serosa on the posterior will of the first portion of the duodenium to insure a safe appointion of serous surfaces for the anastomosis. He stomach and duodenium are inited end to and without closing the upper part of the cut end of the stomach as originally done by Billroth. This operation is unquestionably the most playsological of all types of gastine rescent in the establishes the normal continuity of the gastro intestinal tract and as room they stomatically as the stomach and the restablishes the normal continuity of the gastro intestinal tract and as room the stomach was shown from the develop.

ment of a new sphincter which appar effects a rhythmic emptying of the sto The extent of the stomach removed v from one half to two thirds of the organ anastomosis lies on the head of the pa either in the midline or slightly to the it depending upon the length of the num the degree to which it is mobiliz the amount of duodenum resected T of sutures are used for the anastomos tinuous lock stitch of catgut for the and interrupted silk sutures for th Unquestionably the operation is t difficult and requires more skill and than other forms of resection The can be mastered however by ca tion particularly to the first lave sutures uniting the posterior wall ach and duodenum

The second method of choice is h I with a terminolateral anasto đe scribed by Hiberer (14) in 1922 in the closure of the duodenal st the implintation of the cut end of the ın the side of the second part of the um below the level of the papilla of Vator entails the mobilization of the duodenum ac cording to the method described by Kocher (18) for the removal of calcula from the retroduodenal portion of the common bile duct It is used in those cases of duodenal ulcer in which serosa is lacking on the posterior wall of the first portion of the duodenum It unites the stomach directly with the most alkaline portion of the duodenum. The im mediate postoperative course is characterize! by a tendency to gaseous eructations and vom iting but this usually subsides within a week This type of operation as well as the typical Billroth I operation favors the development of a new sphincter control

The Billroth II operation is reserved for those cases in which it is not feasible to per form a Billroth I As shown in Table III th, group is comparatively small. The antecol, method supplemented by an entero-anaste mossis between the afferent and efferent low of the joinum as described by Braun is preserved to the retrocolic method. The advastage of the antecolic method is that it process for the intercolic method is that it process strains in the duodenoientmal segment.

	UITS OF OPERATION						
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		8	6	1	1		
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INCLUSIONS

method of gastric resection is the operation of choice for ment of gastroduodenal ulcer lifficulties prevent its use. In sees there was no instance of had ulcer thus confirming the

Haberer on the basis of a 1200 cases. It is believed that currences after Billroth I resec o the fact that an ulcer of the has been overlooked or else to g an anastomosis in an inflamed the or duodenum.

one instance of jejunal ulcer in a illroth II resections

up results after resections for hal ulcer show that 96 per cent of were completely symptom free or v improved

wishes to thank Professor von Hahe er for te es extended to him and Doctors Orato r the privile e of us ng ti e re ults of ti en-

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FOLLOW UP RESULTS

In conducting the follow up a card was sent to each patient who had been operated upon requesting him either to report at the out patient department or to answer in writing as to the state of his health Of the 57 patients to whom cards were sent 40 had moved and could not be traced and 36 failed to reply. In other words follow up results were obt uned from 170 pittent. As this was the first attempt at sy tematic follow up it was to be expected that a considerable number of cases would not be located.

The results have been divided into three groups in excellent fair and poor. The patients who were completely tree from preoperatives, improves were put in the first class. Those who stated that they were greatly improved but till had occasional symptoms were classed as having a fur result. Those who developed jejunal ulcers or else reported that they were no better than before the operation were considered to be poor.

Of the 54 patients who were operated upon for gastric ulcer and from whom replies were obtained 45 were found to be in excellent health The majority of these patients had guned over 15 pounds in weight 12 had gained over 25 pounds and 5 had gained over 40 pounds These patients unanimously praised the successful outcome of the opera tion and stated that they had never felt better and that they were able to conduct their daily duties in a perfectly normal manner They were able to eat everything without restric tions and could even drink beer and wine without gastric distress. The o patients who were classed as having fair results complained chiefly of distress after drinking milk or eating sweet foods Others were unable to eat a heavy meal without a sense of discomfort and weakness These latter symptoms are un doubtedly due to the reduced size of the stom ach so called microgastria but the inability to tolerate milk and sweet foodstuffs cannot be so readily explained There were no in stances of returnal or recurrent ulcer At this point it is desirable to recall that of the 81 cases of gustne ulcer 77 were operated upon according to the Billroth I method

The results of gastric resection for duodenal ulcer are probably of greater interest than the statistics for gastric ulcer because duodenal ulcer is considered the most satisfactory indi cation for gastro enterostomy by the advo cates of this operation Replies were obtained from 107 cases Three patients had died of intercurrent disea e Of the remainder 83 were classed as excellent 16 as fair and 5 as poor It is not necessary to report on the first group further than to say that they were com pletely symptom free the werage gain in weight was not as great as in the class of gas tric ulcer patients who had reported similarly good results. Although there were 2 patients who had gained as and 60 pounds respective ly the majority of patients gained only be tween s and is pounds. The patients who had fur results complained mainly of indisposition after enting certain foods or after a heavy meal Of the 5 patients who had poor results 2 developed gastrojejunal ulcers

CASE REPORTS

The first patt int as a man aged 4x upon whom antecolo Billroth II resection was performed on February 4 1025. He was symptom fir e for 4 months and then leveloped periodic epigristic pa as v h ch gradually uncreased in intensity. He was readmit d to he hospital on hyril 20 1936. Gastine analysis show ed a firee acidity of 4 and a total acidity of 1x Rosenfigen exam ation showed a niche opposite the gastro enterostomy stoma and this was confirmed at operation on hyril 2x 1936 when a journal utker was found along the mesentenal border of the guntum at the port in yssuikaed reoriterologically

The second pati at a man of st gave a history of periodic gastr c pruns of 30 year duration A gastro enterostom, performed in 1904 as followed by 6 years of relief. At operation on February 7, 1925, an ulcer of the superior border of the first part of the duodenum vas found. In spite of the fact that the gastro enterostomy stoma shot ed moderate inflam matory chang s a Billroth II vas performed the previous gastro ent rostomy stoma being used Fol lowing peration the patient wa free from all symp toms to one year and g ned 45 pounds in eight At the end of that time he suddenly developed pains heartburn a dishortly thereafter melana. At opera 1 non December 20 1026 a jejunal ulcer was found along the mesenterial border of the jejunum oppo sate the gastro enterostomy st ma On account of the former operative findings t is reasonable to

assume that this ulcer was simply the extension of previous pathological changes

The third patient was a man of 45 who had had gastric disturbance for 5 years. At operation on January 22 1926 an ulcer of the anterior and poste rior wall of the first part of the duodenum was found A Billroth I with a terminolateral anastomo sis was performed. The postoperative course was complicated by persistent vomiting which lasted for Ten months later the patient was re admitted with a history of pain and vomiting of 4 The roentgen examination was months duration negative the gastric analysis showed a total ab ence of free hydrochloric acid the blood Wassermann was negative At a second operation on December 17 19 6 many adhesions vere found between the stom ach and the anterior abdominal wall but the anasto mosis was large and normal in every way. The adhe sions were divided and the abdomen was closed Following the operation the patient continued to comit in small amounts almost daily Roentgen examination was repeated with negative findings The neurologist who saw the patient in consultation was of the opinion that the patient's symptoms were functional in origin and the expression of an anxiety neurosis In January 1928 the patient reported by letter that he was still suffering from gastric symp toms with nausea and vomiting

The two remaining patients who had poor results following operation were likewise neurasthenic indi viduals. One of them had been operated upon previously and a gastro enterestomy performed re operation a superficial ulcer of the anterior wall of the first portion of the duodenum was found and a Billroth I resection gave only temporary relief

Follow up results were obtained from 10 patients in whom both gastrie and duodenal ulcers were found at operation These results were uniformly excellent

As shown in Table III there were 20 opera tions performed for jejunal ulcer. One patient was operated upon 3 times for recurrent jeju nal ulcer and a second patient twice. These cases have been reported fully by you Haberer (15) In this series of 17 cases there were 3 deaths. As 5 patients could not be located and I patient failed to reply the results can only be given on 8 patients. Of these patients 6 reported that they were in excellent health and completely sypmtom free One patient devel oped pain 6 months after operation and the findings of roentgen examination were sugges tive of the presence of a jejunal ulcer other patient developed sudden hematemesis 7 months after operation but as he was also suffering from hepatic cirrhosis the bleeding may have been due to ecsophageal varices

TABLE VI -- RESULTS OF OIERATION

N	f pl	E B	tlt	P
Castric ulcer	54	45	9	0
Duodenal ulcer	107	93	16	5
Gastric and duodenal ulcer	IO	10	0	0
Jegunal ülcer	8	6	1	I
Total	170			

CONCLUSIONS

The Billroth I method of gastric resection is recommended as the operation of choice for the surgical treatment of gastroduodenal ulcer unless technical difficulties prevent its use. In a series of 150 cases there was no instance of recurrent or jejunal ulcer thus confirming the opinion of von Haberer on the basis of a larger series of 1200 cases. It is believed that the reported recurrences after Billroth I resec tions are due to the fact that an ulcer of the po terior wall has been overlooked or else to the establishing an anastomosis in an inflamed area of stomach or duodenum

There was one instance of jejunal uleer in a series of 75 Billroth II resections

The follow up results after resections for gastroduodenal ulcer show that 96 per cent of the patients were completely symptom free or tremendously improved

The author wishes to thank Profe sor you Haberer for the many courtesies extended to him and Doctors Orator and Meizler for the privilege of using the results of their pathological studies

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THE RELATION OI THE HISTOLOGICAL STRUCTURE TO THE PROG NOSIS OF THE CARCINOMATA OF THE UTERINE CERVIN

BAWILLIAN CHUFFIT MD (1 C G
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In recent years definite relations between the histological structure and the progroups of carcinomata have been established through the methodical investigations of several workers. The poincering work was performed by Broder (3-7) who divided the carcinomata of the skin into four groups according to their degree of differentiation and found a definite relationship custing between this scale of histological malignancy and the percentages of cures obtained in the different groups. He also extended his studies to car cinomata of various organs and obtained similar results.

Martzloff (33) classified the primary solid carcinomata of the uterine cervit into three groups according to the predominating cell type present (spindle cell transitional cell and spinous cell) and reported that the per centages of cures increase with the maturity of the type of carcinoma Greenough (13) who studied the carcinomata of the breast divided these tumors into three groups according to the degree of differentiation and anaplasia and also stated the evistence of definite relations between the histological tructure and prognosis of the carcinomata the breast. In communications of Lahm

") Cordua (8) Regaud (30) and others
amiliar statements are made confirming these
andings While these workers restricted their

investigations to a study of the structural and cellular condition of the parenchism of the tumor McCarts (4) examined the relation of the stroma to the prognosis. From a study of the careinomata of the stomach he concluded that the life expectancy is increased when the stroma: I hadmized or fibrotic and when it contains a marked lymphocy tic infilitration.

In a previous paper (16) I described a method of determining histological malionancy of carcinomati of the uterine cervity by a numerical evaluation of 9 different factors recognized as characteristics of different inthon and anaphasia. In this system only histological features pertraining to the purently making the number of factor from q to zo including also tho e-belonging to the stroma. The results of this tudy are contained in the present communication.

The list of the offictors considered is as follows: (1) special cell type of carcinoma (1) nucleocytopha nuc coefficient (3) number of pen il cells (4) infiltrative growth of cells (5) general type of carcinoma (6) irregulanty in six of cells (7) tregulanty in shape of cells (8) distinctness in outline of cells (6) chromatism of cytoplasm (10) functional activity of cells (11) irregulanty in size of

nuclei (12) irregularity in shape of nuclei (13) chromatism of nuclei (14) hyperchio matism of nuclei (15) number of mitoses and prophases (16) irregularity of mitoses (17) character of stroma (18) vascularity of stroma (19) type of cellular infiltration of stroma and (20) amount of cellular infiltra tion of stroma

DEFINITIONS AND TECHNIQUE

I Special cell type of carcinoma The car cinomata of the uterine cervix were classified according to their general structure and the maturity of the predominant cell type into two mun groups the glandular carcinomata and the primary solid carcinomata and cach of these was subdivided into four sub groups

Glandular carcinomata

- r Malignant adenoma
- 2 Papillary and gelatinous adeno carcinoma
- 3 Adenocarcinoma simplex
- 4 Solid adenocarcinoma

S Primary solid carcinomata

- 1 Spinous cell carcinoma with cor nification
 - Spinous cell carcinoma without cornification
 - 3 Round cell carcinoma
- 4 Spindle cell carcinoma

Carcinomata of sub groups i were evalu ated with points those of sub groups 2 with 4 points those of sub groups 3 with 6 points and those of sub groups 4 with 8 points

- Nucleocytoplasmie coefficient ative number of those carcinoma cells which showed a large nucleus surrounded by a small amount of cytoplasm was e timated If 10 per cent or less of such cells were imong the tumor cells 1 point was counted presence in from 10 to o per cent was evalu ated with a points in from 20 to 30 per cent with 3 points and in more than 30 per cent with 4 points

Number of pencil cells Pencil cells described by Lahm (20) as slender cells with dark stained nuclei invading and destroying the carcinoma cells were counted with a point when they were very numerous I'wo points were evaluated when they were present in moderate number 3 points when they were scanty and 4 points when they were completely absent

4 Inhibrative growth of cells The presence of well defined outlines in the majority of the carcinomatous cell nests was evaluated with I point diffuse invasion present in from 25 to so per cent of the cell strands with 2 points in from so to 75 per cent with a and in more than 75 per cent with 4 points

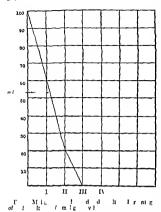
. General type of carcinoma cent or more of the carcinoma was composed of parenchy ma and if 25 per cent or less was stroma 4 points were counted if from 50 to 75 per cent was parenchyma and from 25 to 50 per cent was stroma 3 points were evalu ated if from 25 to 50 per cent was paren chyma and from 50 to 75 per cent was stroma o points and if 25 per cent or less was paren chyma and 75 per cent or more was stroma r point was counted

6 and 7 Irregularity in sie and shape of cells The average size and shape of the tumor cells were studied. Deviations from this size and shape respectively in from 40 to 50 per cent of the cells was evaluated with 4 points in from 30 to 40 per cent with 3 points in from 20 to 30 per cent with 2 points and in less than oper cent with a point

8 Distinctness in outline of cells Distinct outlines present in 75 per cent or more of the tumor cells were evaluated with I point in from 50 to 75 per cent with 2 points in from 25 to 50 per cent with 3 points and in less than 25 per cent with 4 points

9 Chromatism of cytoplasm If the major ity of the carcinoma cells had an almost un stained cytoplasm while the connective tis sue cells were distinctly pink stained 4 points were counted. If the cytoplasm was only slightly pink stained 3 points were evaluated a moderately pink stained cyto plasm was given 2 points and a distinctly pink straned cytoplasm r point

10 Functional activity of cells Granules of keritin and droplets of mucous respectively present in less than 10 per cent of the tumor cells were evaluated with 4 points functional activity present in from 10 to 20 per cent of the cells with 3 in from o to 30 per cent with 2 and in more than 30 per cent with 1 point



II and I Irregularity in si c and shape of nuclei. The same rewpoints and percentages were used in the evaluation of this factor as described for 6 and 7

13 Chromatism of nu let Four points were evaluated if the majority of the nuclei of the tumor cells had nuclei almo t as distinctly stained as those of lymphocytes 3 points if they were somewhat piler 2 points if they were considerably fainter stained and 1 point if they were very pale

14 II sperchromatism of nuclei. If o per cent or more of the nuclei were as drik stained as those of lymphocytes the factor was evaluated with 4 points if from 15 to 20 per cent were hyperchromatic 3 points were counted if from 10 to 15 per cent 2 points and if such nuclei were present in less than 10 per cent 1 point was counted.

15 \(\int \text{ innber of miloses and prophises} \) The mitotic figures and prophases in 10 fields (oil immir ion 1050 \text{ magmification}) were counted. Twenty or more mitoses and prophises were given 4 points 15 to 19 3 10 to 14 2 and 0 to 9 1 point.

16 Irregularity of mitioses I athological types of mitoses present in less than 10 per cent of the mitotic figures were counted with 1 point in from 10 to 20 per cent with 2 points in from 20 to 30 per cent with 3 point and in more than 30 per cent with 4 points

ry Character of stroma A very loose codematous connective tissue stroma was g ven 4 points a moderately loose one 3 a tibrous one and a fibrous one with extensive

hvalinizations r point

18 Yascularity of stroma A highly vas cular stromy was given 4 points a moderately vascular one — a slightly vascular one 2 and one with very scanty vessels 1 point

10 Type of cellular infiltration. A predominantly cosmophilic infiltration of the stroma was evaluated with 1 point one mainly composed of lymphocytes mixed with some cosmophilic leucocytes points one consisting of lymphocytes plasma cells and scantineutrophilic leucocytes 3 points and one predominantly composed of neutrophilic leucocytes 4 points.

o Amount of cellular infiltration. A den e cellular infiltration of the stroma was evaluated with a point a moderately dense one with points a slight one with a points and a very scients one with a points.

RESULTS OF STUDY

The number of histological mahgnancy in dices determined was 8 belonging to 226 different exusions. I wo excisions each contained two carcinomata belonging to different main groups. The patients from whom these tissues were removed were admitted durin the years 1922 to 1927 inclusive. In Table I the 8 mahgnancy indices are shown from a pathological viewpoint.

MALIGNANCA INDEX AND END RESULTS

The clinical value of the malignancy index was tested by a comparison of the malignancy index with the end result. The clinical end results were graded by Schmitz (16) in the following manner end result i when the patient was free of symptoms and showed anatomical healing 3 years lifter the begin ming of treatment end result 2 when the patient lived for 2 or 3 years after the begin

TABLE I -MALIGNANCY INDICES IN 228 CARCINOMATA*

C II typ A	g m fign cy 1 d	R g	N mb of c
A	42 5	40-45	2
Λ_4	50 7	43-61	10
A6	53 7	47-64	4
A8	6 8	47-79	5
S2	49 6	39-62	8
S.4 S6	5 0 8	34-70	5 83
\$6	58 r	41-73	83
S8	65 7	45-76	25
A2 and S2	46 o _o	39-62	10
A4 and S4	50 75	34-70	6
A6 and S6	55 90	41~73	107
48 and 58	64 25	45-79	50
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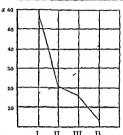
ning of treatment end result 3 when the pa tient lived for 1 or 2 years after the treatment was started and end result 4 when the Da tient lived for a year. The end results were known in 48 cases From this group those cases were excluded in which the carcinoma was already generalized that is in which a frozen oclyis or distant metastases were pres ent at the time treatment was started on account of the invariably infaust prognosis The 48 available cases were divided into 4 groups according to their malignancy index The first group included carcinomata with a malignancy index ranging from 22 to 30 the second those from 40 to 54 the third those from 55 to 60 and the fourth those from 70 to 84 After determining the percentages of end result 1 in the different groups the follow ing relations were found. There was no case with a known end result in the Group 1 in Group 2 with 13 cases an end result 1 was obtained in 61 5 per cent in Group 3 with 8 cases an end result I was recorded in 28 5 per cent and in Group 4 with 7 cases an end result I was not obtained in a single in stance The diagram in Figure 1 ilfustrates the relation between malignancy index and The 'malignancy line follows

the percentages of end results of the four STROMA INDEX AND END RESULTS

groups

Studying the relation between the condition of the stroma and the end result I evalu ated the stroma from the standpoint of its





Parenchyma stroma coeffic ent and end re ult r Percentages of cases - parenchyma stroma coefficient from 135 parenchy ma strom co ff cients from 160

antiblastic character The resulting stroma index represents the sum of an evaluation of the factors 4 5 and 17 to 20 of the malignogram A hyalinized stroma was evaluated with 4 points a fibrous one with a a moderately loose one with 2 and a loose one with I point The total range of the stroma index is from 6 to 24 The average stroma index of the 17 cases with end result 1 is 148 ranging from II to 21 the average stroma index of cases with end results 2 3 and 4 is 1 6 ranging from 8 to 18 The stroma index apparently shows a certain relation to the end result

PARENCHYMA STROMA COEFFICIENT AND END RESULTS

I also attempted to ascertain the relation between the blastic properties of the paren chyma and the antiblastic qualities of the used a parenchyma index the sum of the evaluations of the factors 1 to 16 of the malig nogram The ratio of parenchyma index to stroma index represents the parenchyma stroma coefficient. The parenchyma stroma coefficients thus obtained were divided into two groups those between 1 and 3.5 and those between 2.6 and 9. From Figure it is evident that the parenchyma stroma coefficient is apt to be low in cases with good prognosis while it is in general high in crises with bid prognosis and rapid course of the disease

MALICAANCA INDEA AND PROGNOSIS

The prognosis of a carcinoma considered as the local manifestation of disturbance of general nature depends upon numerous fuctors of different character. They may be inherited or acquired permanent or transient local or general varving in quality and intensity, affecting different or units and appearing at different time. They can be divided into four group a follows.

The malignancy of the carcinoma repreented by the infiltrative de tructive and

metabolic qualities of the tumor cells

The endogenous blastic and antibla tic local and general properties of the organi m pertaining to race sex age hereditary con stitution functional activity of the endocrine gland tonus of the vegetitive nerving y tem condition of the reticulo endothehal sy tem cellular fermentative and phy ical and chemical status of the blood lymph and or gans of the body especially of the affected

3 Fvo-enou factors (1) which contributed to the origin of the tumor (far parafin roentgen rays arsence bacterial and parasitic ubstances and main others of chemical and plivical nature). These factors may remain active during the course of the neoplasm or they may become inactive before the tumor becomes clinically manifest and (b) which make their appearance after the tumor growth has become established as intercurrent disease as changes in nutrition environment therapeutic procedures. They may everi favorable or unfavorable influence upon the vital activities of the tumor and the blastic qualities of the host

4 Secondary complications produced by the neopla m of nonspectic nature (a) Those of mechanical character as due to compression or obstruction of glindular ducts ureter interine osophigu etc. (b) Secondary. infections of the tumor and the surroundin tissue which decrease the general resistance and prove sometime fital (mediastinitis in cesophageal carcinoma) (c) Resorption of toxic decomposition products from necroses of the tumor.

It is obvious from this compilation of the different factors that the histological malinancy index in which only the potential malignancy of the circinomia and the local antiblastic forces are ealuated cannot give definite information about the future course of a single carcinoma. Such knowled e can only be obtained as the result of a consideration of ill of the factors already mentioned and probably by others still unknown to us Not before the histological malignancy index is supplemented by a clinical malignancy index we will be able to determine the prognosis of a circinoma more accurately and reliably than we can do it at the present time

HISTOLOGICAL STRUCTURE AND RADIOSENSITIVENESS

The detailed histological analysis of the arcinomata of the utenne cervax presented in this paper offered a good opportunity for the tudy of the correlations which might exist between the histological structure and the radiosensity eness of the e tumors With ers (37) in a recent paper asked that the pathology should be interpreted into terms of radiosensitiveness and Lahm (20) stated that the radiologist wants information as to the growth tendency of the carcinoma and the defensive reaction of the surrounding tis sue on which he may base his considerations in regard to technique and dosage. Regard (.o) noted that a detailed knowledge of the histological character of the tumor may fre quently influence the therapeutic radiologi cal technique

Up to the present time the attempts made to establish these correlations have been so monodusive and the re ults obtuned by the different workers so divergent that no definite information has been obtuned. Dautitic (ro) concluded from his investigations that histological structure and radiosensitiveness do not show any interdependency. Readul (30) observed a decrease of radiosensitivenesses)

with increasing immaturity of the carcinom ita but could not find any relation between radio sensitiveness and the condition of the stroma Cordua (8) saw considerable variations of the radiosensitiveness of inoperable carcinomata of the uterine cervix of the same histological type He regarded adenocarcinomata as re fractory and observed better primary results in carcinomata of a medullary type (28) stated that middle ripe carcinomata con taining many mitoses growing in large alveoli and possessing a moderate amount of stroma reaction render the best results Lenz (1) noted also that adenocarcinomata of the cervix were radioresistant. Recurrences oc curred in almost all adenocarcinomata Locb (22) however asserted that the apparent radioresistance of adenocarcinomata is caused by their location deep in the tissues where they are less accessible to the action of the rays while they are actually more sensitive than spinous cell carcinomata Lahm (20) reported that he excludes rapidly growing and immature carcinomata from treatment with roentgen rays He stated further that plear form carcinomata react well while very vas cular and medullary ones are not very sen sitive to roent; en rays Boehm and Zweifel (2) noted that carcinomata composed of cells with abundant cytoplasm growing in narrow strands surrounded by young proliferating connective tissue with inflammatory reac tion and eosinophilic infiltration give the best results while carcinomata growing in broad columns surrounded by a resting stroma are less susceptible to the action of They do not recognize the roentgen rays law of Bergonic that unripe and rapidly grow ing carcinomata are more sensitive than ripe and slowly growing ones as correct and agree in this respect with Adler Kehrer Frankl I ahm and others Withers (37) reported that carcinomata of a mature type containing many mitoses hyperchromatic nuclei marked functional activity and a very vas cular and loose connective tissue stroma are more radiosensitive than those tumors in which all or some of these features are absent Cramer (o) also observed better results in carcinomata with a hyperemic stroma than in those with an anamic one Adler (1) saw better roentgen ray effects in mature car cinomata than in those of an immature type Pemberton (27) however asserted that the cell type is insignificant for the radiosensitive ness and that the parenchyma stroma rela tion is important in this respect. He in turn is contradicted by Alter who stated that the radiosensitiveness decreases with the increas ing maturity of the carcinoma an assertion which puts him into a juxtaposition to Re gaud (30) and Schmitz (33) Roussy and Leroux (31) and Rubens Duval (32) stressed the importance of the condition of the stroma for the radiosensitiveness of the carcinoma The karyokinetic index of Licassagne and Monrod is not considered as indicative of the radiosensitiveness of a carcinoma by most authors including Minoflet and Schrumpf Pierrou (25) Roussy Laborde and I erous (31) Regaud (30) Proust Delbet (16) and many others

From this incomplete compilation of references of the literature the existing discrepancies of opinions are evident. Several factors are responsible for this fact for instance

r Variations in the interpretation and evaluation of the histological structure of carcinomata by the different investigators

2 Varying consideration of the clinical aspect as extension location and macros copical appearance of the carcinoma

3 Insufficient consideration of the differences custing in the general condition of the patient as represented by age state of nutrition etc.

4 Differences in the radiological technique and dosage used by the different workers. The effects produced by the roentgen rays may be divided into three groups according to the parts affected.

A Iffect on the carcinoma cells

I Direct photochemical action (a) Diffuse cy tocaustic action producing acute cellular necrosis (b) Selective cytolethal and cytoregressive action. The cytoplasm shows swelling edema clumping disappearance of the plasmosomes vicuolation and fatty degeneration. The nucleus presents increased irregularity and indistinctness in outline hyperchromatism, and lysis. Disturbance of the mutotic process evidenced by the appearance

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F 1 vi f 1ls		1	-		_	-			-						_	_		_	П
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of Broeckelmitoses slowing of the mitotic process resulting in congestion of mitoses in the first days following the irradiation and subsequent decrease of the number of the mitotic figures represent the effect upon the proliferative cellular qualities. These degen erative changes of the tumor cells are either followed by death of the cells or they represent only a transient stage of lowered vitality from which they may recover if they are not destroyed in this stage by the attack of the defensive forces of the body. Besides these

TIBLE II THETOLOGICA

MALIGNOGRAM OF TEN CASES

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remtent tumor cells there may also exist re fractory cells Waetgen (36) saw after inten sive treatment well preserved carcinoma cells and Seidemann (34) reported the presence of carcinomata which had a perfectly normal appearance in the crater formed by the vagi nal radiation employed in a case of cervical carcinoma

2 Secondary effects (a) Modification of growth by increase of the degree of differen tiation and stimulation of the functional activity A basal cell carcinoma may for instance change into a spinous cell circinoma a spinous cell carcinoma into one with cormficitions an adenocarcinoma simplex into a gelatinous adenocarcinoma etc. (b) I ctarda tion of growth due to the impairment of the proliferative qualities of the tumor cells (c) Stimulation of growth in refractory parts of the tumor evidenced by the increase of the histological malignancy or caused by a break down of the local or general resistance due to too intensive irradiation. This becomes manifest usually in from 6 to 8 weeks after the treatment.

B Lifect on the troma

Primary effects They precede the changes taking place in the prunchymri (Opitz 6) (a) Hyperimia and oedema due to paresi of the ve sel wall (b) Proliferation of fibrobla t in tocyte und capillarie (c) Increase of the leucovite and lympho cytic infiltration \(^1\) marked primary stroma reaction i regarded as a favorable in (Ounch and Cutler o)

Secondary effect (a) Fibrosis and hy alinization of the increased connective tissue It surround the remaining ear cinoma cells with a fibrous barrier. An actual choking of the tumor cells by the stroma as asserted by some authors (Opitz 6 Fraen Teilhaber 35 etc) and denied by others (Hamperl and Schwarz 14 seems to be improbable because the tumor cells recover from the effect of the radiation more auckly than the cells of the stroma (b) Obliteration of the vessels of the stroma after thickening of the vessel wall. In recur rences a decrease of the cellular reaction and a loosening and decrease of the connective tissue stroma may be observed (Hamperl and Schwarz) Recurrences originating from en capsulated tumor cells will occur if either the malignancy of the carcinoma cells increases or the local and general resistance decreases due to changes of endogenous or exogenous factors

C Effect on the organism in general (a) Changes in the blood. They depend upon the extent and vasculanty of the radiated area. There are changes in the number and ratio of leucocy tes and lymphocy tes changes in the physical qualities of the blood (sedi

mentation time coagulation time surfactension etc.) changes in the chemical coaposition of the blood (calcium and potasium cholesterol and lecithin etc.) and changes in the ferment content of the blood (hipolytic and executely to five endocing glands (c) Changes in the torus of the vegetative nervous system (d) Chan es in the status of the reticulo endothelial system (c) Changes produced by the resorption of toric decomposition products of the radiated

Ten cases with two or more sections removed during the course of treatment were available for a study and the effects of roentgen rays upon the different histological factors of the milgnogram and of the interrelation between radiosensitiveness malignancy index and end result are shown in Table II.

Among the 20 factors of the maligno ram only 8 showed in the majority of the cases a deviation from their original value toward one The nucleocytoplasmic coefficient was increased after the roentgen ray treatment in 2 cases and decreased in 5. The ratio in points between these two groups was 2 10 The irregularity in size of cells was increased in 1 case and decreased in 6 cases (ratio 1 6) The functional activity of cells was increased in 2 cases and decreased in 4 (ratio 28) Irregularity in size of nuclei was increased in r case and decreased in cases (ratio 29) The number of mitoses was increa ed in I case and decreased in 6 cases (ratio I I.) The character of the stroma was increased in 3 and decreased in 6 cases (ratio 6.8) The vascularity of the stroma was increased in a and decreased in 6 cases (ratio 3 8) amount of cellular infiltration was increased in 6 cases and decreased in 1 case (ritio 8 1)

The average decrease in points of the carcinomata with malignancy indices be tween 40 and 54 was 7 points that of 6 car cinomata with malignancy indices between 55 and 69 was 5 5 points and that of 3 car cinomata with maligning indices between 70 and 84 was 17 point.

The average decrease in sections removed in the first month after the beginning of the treatment was 8 points that of sections removed in the second month 5 points that of sections removed in the third to tenth month

-1 7 points

The average decrease of the _ cases that were cured was 5 5 points while the average increase of the 4 fatal cases was o 5 points

## SUMMARY AND CONCLUSIONS

A report has been given of a method of numerical evaluation of histological malig nancy freed to a large extent from the influence of individual interpretation by the introduc tion of 20 different factors representing his tological qualities of the parenchyma and the stroma of carcinomata

2 The sum of the evaluations or the his tological malignancy index possesses a definite relationship to the end result

stroma index or the sum of evaluations pertaining to the antiblastic qualities of the stroma was in general higher in eases with end result I than in those with 3 and 4 dying in the first 3 end result vears after the onset of treatment

4 The parenchyma stroma coefficient showed a definite relation to the duration of

the disease

- 5 Definite information concerning the course of a carcinoma depends on numerous local and general endogenous and evogenous factors The histological malignancy index in which only the histological evidence of the malignancy of the tumor cells and the local reaction of the organism is considered can therefore render an approximate estimation of the future course of the disease
- 6 Radiosensitiveness of a carcinoma de creases with an increase of the malignancy index
- 7 A malignancy index which remains sta tionary or shows only minor variations from the value obtained before the beginning of the roentgen ray treatment points to the

presence of a radiorefractory carcinoma while a marked drop of the value of the malignancy index after radiation is apparently indicative of a good radiosensitiveness of the tumor

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# AN EXPERIMENTAL STUDY OF MUSCLE ATROPHY

BY ROBERT & LIPPMANN M D AND SFTH SELIG New YORK
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THERL still remains some conflict of opinion regarding the mechanism of acute muscle atrophy following arthoris and trauma. Most of the tindard tertbooks of medicine neurology and pathology dismiss the subject with a reference to the speed with which atrophy can appear after acute arthoris. (McCullum Aschoff Tilney and Piley Sachs and Hausman).

French in his Index of Differential Diag nosis 19 I state. The atrophy is ome times so rapid that some think it cannot be due simply to disuse but must have a neuro

pathic factor also

In Rost s P thiolo teal in town of Surgical Diseases 1923 there is a brief chronological account in which the author state that the widest acceptance has been won by the reflect theory of Brown Sequrard However he men tions later experimental results incompatible with the theory and concludes that the problem I till unsolved

Dana's Textbook of Ver our Diseases has the following to say In inflammations of joints the muscles moving them are affected by a simple atrophy which is called arthritic. The atrophy is probably due in part it of disuse and in part it is a reflex trophic disturbance.

In the Orthopedic Surgers of Jones and Lovett it is stated that in every synovitis there occurs early an atrophy of muscle which is an essential part of the affection and not a complication. The same condition occurs after fixation of a limb and at times in connection with an injury to a limb not accompanied by frank synovitis and accompanies chronic joint disease as an integral part of the affection.

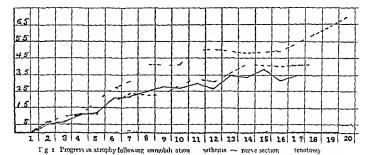
The study here presented was undertaken at the suggestion of Dr P W Nathan to ditermine more accurately the relative speed and extent of the various types of acutasecondary muscle atrophy in the hope that the results would cast some further light on the mechanism especially of the arthrogenic type Although the mechanism remains uner pluned acute utrophy following arthritis habeen recognized since Hippocrates Before the work of John Hunter 1833, it was generally assumed that disuse of the affected binb wathe factor that caused the atrophy John Hunter wrote. The lessons that involve the ligaments the tendons and the aponeuro esparticularly those due to sprain (trauma) disturb the functions of the muscles to a greater degree than those that involve the muscle themselves in that such lessons by simpathy cause atrophy and loss of yigor.

Brown Sequard in 1860 first suggested a reflex mechanim. He believed that the efferent visomotor nerves were stimulated by the irritation of the arthritis with confequent viso prism that caused faulty muscle nutri-

tion

Thrteen were letter Aufpian attempted to prove this by artificially stimulating the effected nerves. He was unable to demonstrate significant nervous control of the muscle vessels by this means and concluded that the reflex mechanism causing muscle atrophy was not that proposed by Brown Sequard. He then suggested another reflex theory are the muscular trophic centers in the cord and the stimulation of these centers cause the muscle to atrophy. This theory was almost simultaneously, enunciated by Paget.

Numerous other theories were suggested at approximately the same time. Sabourin in 1933 annoinced an elaborate one based on direct extension of the pathological proce. He believed that the inflammation proceeded from the joint peripherally to the fibrous muscle sheath thence to the neurolemma the nerve the nerve ending and finally the muscle. As late as 1888 bytempiell on the basis of microscopic findings believed that the atrophy was due to the extension of the inflammatory process in the joints to the muscles. The inadequacy of these theorie was more or less conclusively demonstrated by



Duplay and Cazin in 1893. These authors microscopically studied the atrophie muscles as well as the nerves and neurolemma and could find no evidence of inflammatory change. It is not to be denied that acute inflamma tory arthritic processes may extend beyond the joint. However, the fact that acute atrophy does occur in the absence of such extension is sufficient evidence to show that the extension does not cause it. Also, the theories depending on direct extension do not account for the atrophy occurring after aseptic joint lesions which certainly do not spread to sur rounding tissues.

In 1877 the first effort to reproduce arthrogenic atrophy in animals was published by Valtat. He produced arthritis in the Anees and shoulders of guinea pigs and dogs by traumatizing the joint and by the use of irritating substances. The animals were killed at varying periods thereafter and marked atrophy of the musculature about the joint was found.

Valtat's methods were crude the muscles were weighed wet and his procedure of weighing entire extremities is a most difficult one to carry out accurately. Nevertheless his work sufficed to demonstrate that acute arthrogenic atrophy occurs in animals and to give some idea of its extent and speed.

Valtat initiated an era of concentration on the subject in France and in 1890 Raymond and Deroche announced that their expenments had proved the reflex theory to be cor rcct Raymond produced arthritis in the knees of dogs and cats by cautenzation and the introduction of silver nitrate. The animals were killed at varying periods following the injection and the rcctus femoris muscle of the arthritic extremity was weighed. The same muscle on the opposite extremity served as a control. He confirmed Valtat's experiments

In a second group of two animals arthritis was produced in both hind limbs after unilaterial section of the posterior spinal roots from the third dorsal to the third sacral segment. The weight of the rectus femons muscle on the side of the cut roots was much greater than the other side. In fact, the weight ratio was similar to that in the first group of experiments. From these experiments it was concluded that the reflex path was essential for the production of acute atrophy. Deroche duplicated and confirmed Raymond's work.

At approximately the same time Hoffa be came interested in the problem. It was his first belief that the pathological joint effusion was absorbed through the lymph channels by which route it came into contact with and affected the extensor muscle groups. He tried experimentally to demonstrate the anatomical plausibility of this by injecting the knee joints with colored substances that could later be recognized in the musculature. His experiments showed the substance only in the deeper muscles (vasti). None could be demonstrated in the rectus femoris a muscle that had been

shown to atrophy after knee joint inflamma tions. Hoffa then in 1908 repeated Paymond and Deroche's work and confirmed their con

clusions in every particular

While Hoffa was still engaged in this work Sulzer in a paper published in 1807 main tained that arthritic atrophy could be ac counted for by mactivity alone He showed that the muscles spanning ankylosed joints were atrophic as compared with those of the normal leg He also showed that muscles spanning two joints (recti) one ankylosed and one normal were less atrophic than muscles with completely fixed origins and insertions (vasti) This work was done chiefly on cases of chronic arthritis. Sulzer concluded then that fixation can produce atrophy His work however does not prove that it can be pro duced in the short time in which arthrogenic atrophy may appear

Bum a pupil of Sulzer attempted in 1906 to obtain experiment il evidence for Sulzer's point of view. Bum injected the hip joint of a rabbit with an irritating solution and

plinted the opposite side. The animal was killed in a few days and the muscle weights were measured. The atrophy was more extensive on the splinted side. In a second rib it Burn injected the knee joint of one side and splinted both extremities. Muscle weights after several days showed the atrophy to be equal on both sides and on this basis. Burn concluded that inctivity was re-possible for the atrophy in both cases.

Schiff and Zak in 191 continued and elaborated Bum's experiments. They quoted the results of Hoffa Ray mond and Deroche admitting the correctness of their observations but questioning their interpretation. They suggested that in the experiments of these observers atrophy is absent on the side of the sectioned posterior roots because prin sensation is absent and there is no consequent distinct the section of the reflex path in itself does not prevent the atrophy but merely obviates pain which when present causes limitation of voluntary function.

Schiff and Zak employed both the wet and the dry methods of weighing in their experi ments. They used chiefly the quadriceps group. One extremity of a guinea pig was immobilized in plaster and the muscles of both sides weighed on the seventh day. The results corresponded with Bum's experiments marked atrophy was present on the immobilized side (quadriceps)

But complete mactivity does not always follow arthritis. Therefore a second expeniment was undertaken to reproduce the effect of partial mactivity. The Achilles tendon of a series of guinea pigs was cut on one side. This the authors felt produced partial mactivity. After 7 to 9 days there was decided

atrophy of the entire extremity In order to eliminate the possibility that a

In order to eliminate the possibility that high pertrophy of the opposite leg accounted for the weight difference a third study was under taken. The Achilles tendons of both side were cut in two dogs. On one side of each the knee joint was injected with turpentine afthritis and the severed tendon showed only 4 per cent more atrophy than the side that had only the tendon severed. Schiff and Zak were satisfied that partial inactivity could produce the same degree of atrophy as knee joint arthritis and that partial inactivity following a painful knee joint was re pon ible for the subsequent atrophy.

The work of these observers may be criti cized from several aspects. In the first place an in ufficient number of animals was em ployed to insure accurate results. Our expen ments have shown that many extrangous fac tor such as plaster bruises and exconations or even plaster pressure with intact skin may influence to a surprising degree the atrophy of the muscles of the extremities this factor will be further considered in our immobiliza tion experiments Besides the factor of accu racy there are several assumptions which we believe are unjustified. That external fixation or immobilization is equivalent to complete muscle mactivity certainly cannot be ac cepted by us This will be fully discussed at a later period. Here it will suffice to say that a muscle immobilized cannot necessarily be considered as being in a state of complete mactivity

Again we may criticize the assumption that atrophy of the muscles following achillo tenotomy is due solely to partial dis se The possibility that a reflex mechanism concerned cannot be so easily dismissed

A further study was undertaken by Schiff, and Zak namely a repetition of Hoffas experiments (section of the lumbar and sacral ierve roots on both sides with the production of inflammation of one knee joint). This experiment resulted after several weeks in only to 5 per cent atrophy of the quadriceps on the affected side. A control animal in which the posterior nerve roots were cut but the knee joint left intact, showed a similar small amount of atrophy so that in both cases the atrophy was attributed to maetivity by these observers.

In the fifth group of unimals the dorsal cord was sectioned and one knee joint in jected. The animals were killed after weeks and the leg muscles of the injected side were 6 to 1 per cent beavier. This finding is difficult to reconcile with the reflex theory according to which the greater loss should be on the side of the inflamed knee joint.

Schiff and Zak explain that the cord section causes rapid atrophy of both legs but the atrophy on the side of the joint inflammation is delayed by the stimulation of the lower motor neurone reflexes caused by the joint irritation. The assumption that the reflex are preserves the musculature in this case does not imply a trophic factor. (These authors believed that the irritation of the musculature produced muscular contraction and thereby prevented the inactivity.)

Legg in 1908 reported a further study of

muscle atrophy following arthritis groups of three rabbits each were employed In the first group one knee joint of each rabbit was inoculated with a suspension of viable tubercle bacilli The same procedure was per formed on the second group but in addition the leg was immobilized by means of a tin splint. In the third group one leg was splinted but the knee joint not infected. The animals were all killed after 40 days and the rectus femoris was measured by the microscopic method (taking an average of the diameters of 300 fibers) His results showed that im mobilization alone causes as much atropby as immobilization plus infection (r2 per cent) The group in which the knee joints were in

fected but not spinted showed less atrophy (7 per cent) than either of the other two groups. The atrophy produced by tubercle bacilli (7 per cent in 43 days) is of such small amount that we are not justified in calling it acute atrophy (turpentine atrophy reaches this degree in 2 days).

Legg attributes all these types of atrophy to reflex vasomotor impulses which cut down the blood supply to the affected part. We can however find no evidence for this view in the results of his experimental work. It will be remembered that Brown Sequard held a similar view but Vulpian failed to produce a marked degree of vasospasm by stimulating the effectnt nerves. The possibility that such diminution of the blood supply could produce the extreme degree of atrophy that follows acute arthritis certainly does not coincide with our clinical experience. (There is for example little or no atrophy following throm bo anguits obliterans of long standing.)

In 1026 Harding made an interesting eon tribution to the subject from a different as pect Two parallel series of rabbits were em ployed in one of which (14 in number) a knee joint arthritis was produced by the strepto coecus infrequens. In the other series (6 in number) one extremity was immobilized in a plaster spica After 3 weeks the femoral arte rial and venous blood was drawn from the animal under anæsthesia and subjected to gas analysis to determine the oxygen consumption in the extremity The animals were then killed and the quadriceps musele group weighed the opposite side being used as a control

Harding s results showed practically a doubling of the oxygen consumption in the arthritic atrophy cases whereas the immobilized animals showed only a slight increase above normal. Harding believed that this difference was due to a higher rate of muscle eatabolism in arthritic atrophy than in immobilization and that this indicated a different mechanism of production.

Further experimental work along these lines is certainly necessary before Harding's interpretation can be accepted. It is possible that the administration of an anæsthetic is a complicating factor. Again it may be that any

spastic muscle will give evidence of as great an increase in oxygen consumption regardless of its size diminution In other words no evidence is presented that the increased catabolism bears any direct relationship to the atrophy

From this brief summary of the literature upon muscle atrophy it is clear that there still exists a considerable diversity of opinion as regards the mechanism and cause of this condition. There are moreover rather remarkable differences in the results obtained in the experimental work undertaken to clear up the subject and even where the results ob tained by experiment are similar the authors are at variance as to their interpretation

For these reasons we decided to repeat the experimental work that has been done in the hope that by taking reat care to have the experimental method ac urate and the find ings unequivocal we might be able to clanis the subject

One hundred and cichteen rabbits were used in the study

The semitendinosu muscle was used for the tirst three groups of experiments chosen because of the following reasons

- I It is an auxiliary muscle and therefore its paralysis caus a no di crinble lamene s or disability
- It is a red muscle -completely sur rounded by the pale adductor mannus and it can be accurately dissected out
- 3 It has a small and well defined origin and insertion which can he accurately dis sected or sectioned
- 4 It cros e the knec joint and will be iffected by pathological processes in that
- The nerve supplying this muscle is single and can be ectioned by a posterior approach is it leave the sciatic trunk thus minimizing the possibility of injury to the blood supply of the muscle to the muscle itself

It was neces ary to employ the gastrocne mius muscle for the fourth group (immobiliza tion experiments) As the semitendinosus muscle takes its origin from the pelvis in or der to immobilize this muscle it is necessary to immobilize the thigh on the pe vis. In the rabbit it was found impossible to accomplish this unless the motion of the opposite lower extremity was restricted and this would preclude the use of the opposite member as a control On the other hand the gastrocne mens can be immobilized by means of a plaster spica without any effect upon the opposite extremity

To determine the variation that might exit an normal muscles and to determine the more accurate method of weighing to be adopted we dissected and weighed semitendinosus mu eles in a series of ten rabbits that had not been operated upon. The muscles were weighed both wet and dry For the dry weighing the muscles were washed in water and dried for 4 hours in a dry chamber with a constant temperature of 100 centi, rade

By the wet method the average difference hetween the muscles of both limbs was 7 per cent by dry weight there was a variation of 2 per cent From these findings as shown in Table I we considered the dry method of weighing to be the more accurate and this method wa therefore used in all the expen ments (1 able 1)

TABLE I -WEIGHTS OF THE DRIED SEMITEN DINOSUS MUSCLES IN TEN NORMAL RAB RITS NOT OPERATED HEAN

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6	3	9		64
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# TECHNIQUE OF EXPERIMENTAL ARTHRITIS

Turpentine was used as the irritant After iodinization of the skin overlying the knee joint the turpentine was injected hypoder matically into the knee joint For the animals that were to be killed before the third day after the injection o 75 cubic centimeter was used o 5 cubic centimeter was used in those killed on the third day o 2 cubic centimeter was used for all animals that were to live

## TABLE II -TURPENTINE ARTHRITIS

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3	Right	2	0 75	205	282	017	0	5	
4	Left	2	9 75	275	260	015	8		
4 5 6	Pight	3	0 5	232	232	020	8		
6	Right	3	05	242	257	015	6	66	
7 8	I eft	3	0 5	383	347	036	9		
	Right	4	0	377	417	C40		5	
9	Leit	4	0 2	397	345	052	13	10 0	
10	Right	4	0 2	320	354	034	10		
11	P ght	5	0	496	561	065	11		
I	Left	5	0 2	8,8	752	102	13	12 2	
13	Left	5	0.5	397	34I	0 6	14		
14	Right	b	0 3	235	331	<b>o</b> 86	26		
15	Right	6	0 2	256	295	039	13	21	
ıŏ	Left	6	0 2	338	256	032	24		
17	I eft	7	0 2	103	312	093	23		
18	Right	7	0 2	275	370	002	24		
19	Left	7	0 2	517	423	094	18		
20	Right	8	0 2	286	384	098	26		
21	Right	8	0 2	355	470 268	115	25	5	
22	Left Left		0 2	345		076	23		
23	Left	9	0 2	472 287	315 373	157 056	33	28	
24	Right	9	0 2			<b>6</b> 9	23 8	40	
25 26	Left	10	0 2	235 438	327 293	145	33		
20	Left	10	0 2	386	206	000	24	7	
7	Right		•	274	382	103	23	,	
20	Left	11	õ	436	395	131	30	30	
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31	Îeft	12	0 2	374	273	106	27	26	
32	Right	12	0 2	288	392	101	28		
33	Right	13	0	197	200	093	32	34 5	
34	Left	13	0 2	343	217	126	37	•••	
35	Right	: 14	0 2	420	627	207	33	33	
35 36	Pight	2.5	0	310	515	05	38	38	
37	Left	16	0 2	260	165	095	37	-	
37 38	Right	: 16		182	246	0(4	26	31 5	
39	I eft	17		357	227	130	36		
40	Right	17	0 2	113	167	054	33	34 5	

more than , days When a larger amount was used (in the latter groups) the purulent effusion usually broke through the capsule of the joint and infiltrated the musculature of the extremity (Animals which on autopsy showed extra articular inflammation were not included in this statistical sti dy )

# TECHNIQUE OF NERVE SECTION

Under ether anæsthesia preceded by a quar ter grain of morphine by hypodermic a one half inch incision was made in the direction of the fibers of the gluteus maximus muscle The fibers of the gluteus maximus and the underlying medius were separated by blunt dissection and retracted and the scirtic nerve

TABLE III -- VERVE SECTION

Op t 1 fe	D t n	Ne ght f ght m t d	We ght f  Ift m t d os	D ff	At phy P	D l t phy P
Left	2	328	315	org	4	4
I ight	3	286	302	017	6	7
Right	3	300	340	010	8 5	
Left	5	405	366	030	9 7	1
Right	5	327	381	054	14	
Picht	0	28	358	070	21	19 5
		544	447	997	18	
Left	7	337	25f	081	4	2.4
Right		88	375		3	3
Right	9	265	345	080		
I eft	9					3
Left	9		94		5	
Pigi t		343	482		29	9
Left		617	384	233	37	33 5
Right		183		078		
					33	30 5
			355			
				135		42
		192	353		45	
Left		183	126		35	40
				111		41
Kı ht	50	182	345	163	53	53
	1e	Left 2 Lught 3 Rught 3 Rught 5 Rught 5 Rught 5 Rught 6 Left 6 Left 6 Left 9 Left 9 Left 9 Left 10 Left 11 Rught 11 Rught 11 Left 12 Left 14 Rught 1 Left 16 Left 16 Left 16 Left 16 Left 16 Left 16 Left 18	Op	1   1   1   1   1   1   1   1   1   1	Column   C	Op the part of the

The nerve to the semitendinosus exposed leaves the sciatic about a quarter of an inch below the scratic notch and can be easily identified and sectioned. Wounds were closed with silk and a collodion dressing was applied The posterior approach was used because it is easy of accomplishment and does not en danger the blood supply to the muscle

# TECHNIQUE OF TENOTOMY

Under ether and morphine anæsthesia a vertical incision was made on the inner side of the leg just distal to the knee joint. The tendon of the semitendinosus was identified and brought into the wound with a blunt hook It was then sectioned close to its tibial attachment Wounds were closed with silk and a collodion dressing applied

## TECHNIQUE OF IMMOBILIZATION

For reasons mentioned above we used the gastrocnemius for these experiments Immo bilization was accomplished by the application of a plaster spica extending from the mid thoracic region to the toes I he plaster band age was applied directly to the animal with out the use of padding. The fur of the animal proved to be adequate protection against pressure sores

This type of bandage immobilized the thigh len and foot completely

## EXPERIMENTAL DATA

The results of these four groups of experiments for the sake of brevity are given in tabular and chart form

CONTROLS

Ver e section. In order to a certain whether the shock of the operation played any part in the atrophy caused by nerve section three animals were operated upon jut as for a nerve section except that the nerve was not sectioned. After the nerve was exposed and retracted with the blunt hook it is a allowed to drop back into the wound and the wound was closed. The result are sho n in I able IV.

Table IV shows that operative trium played an insignificant part in the amount of atrophy. The possibility that there is additional nerve supply to the muscle was excluded by circlid dissections. In no case was an access ory or anomalous nerve supply to the semitendinosus disjovered. The atrophy recorded on the chart, therefore represents that solled, due to nerve section.

TABLE IN -- CONTROL PYPERIMENTS FOR THE ATROPHY FOLLOWING NEPVE SECTION

			i h	"11 !		
			m ^a	m da		
N.	<b>গ</b> ব	I			L	ŧ
I	R ght L ft		585	585	001	
11	L ft		388	3 7	0	3
III	L ft	(	5	5		

Teneloms Lipschutz and Audosa in their experimental controls incised the tendon it self but did not cut it through. Their reported insignificant atrophy following this procedure and concluded that probably the atrophy consequent upon nerve ection and tenotomy are analogous and due to the mability of the muscle to function I e disuse.

In order to rule out the possibility that the trauma of operation plays some part in the atrophy in our own cases we exposed the tendon and subjected it to friction in three rabbits. As shown in Table VI the atrophy following this procedure was insignificant. Hence it must be concluded that the operative trauma may be disregarded and that the

TABLE V -TENOTOMY OF SEMITENDINOSIS

		1	W h	W gh			4
		٠,	f	f	Dff		`d
		t 0-	ght	1.1		A 0-	0-
	84	my	m	m	a,	phy	bpà
y w	m d	a y	t d	t d	w ght)	pe.	Dc.
-	P ght	2	349			_	
	1 it		10	331	7	5 8	5
_	70 11.	1	- 10	9)	7	- 0	7
3	Rgit	3	18	104	12	6	
4	Left	4	540	48	0 3	9	1
6	left	4	33	29	036	1	
Ð	I ght	5	76	2 7	041	9	19
8	I ght	ć	15	18	057	3	
8	I eft	ſ	3 3	2 7	86	27	7
0	R ght	6	-00	67	67	4	
٥	1 it	7	3	67	of 3	3	32 5
	L it	7	573	395	¢3	33	
	I eft	8		5	So	4	4
3	R ght	Ś	95	34	45	42	-
4	Left	0	528	315	13	4	42
•	Pight	0	41	3,3	345	44	.,.
6	Right	,	68	5	107	30	4 5
7	Lelt		9	16	130	44	٠.
ś	Right		1 7	95	88	46	5
ó	I ft		37	93	6	54	3
٠	Lít		4 1/	16		48	
	I die	4	4		94		4 5
	1 11:	6		3 4	73	47	
		0	34	6	1,3	49	49
23	Lht	8	8	64	146	59	59 69
4	Lft	٥	377	ò	257	63	09
	Rult			400	68	1.7	5.1

atrophy following tenotomy is due entirely to the section of the tendon

TABLE VI -- CONTROL EXPERIMENTS FOR THE ATROPHY FOLLOWING TENOTOMY

			W ught f h m d	lite M			
`	1.2	D >	0-	0s	Lo	P	
.1	L It	4	386	378	003		
II	R ght	2	47	45	003		
111	Left	4	3 6	314		3	

From the results of the immobilization erperiments as shown by Table VII we must
conclude that the atrophy if any resulting
from immobilization is slow in onset and neer
reaches the proportions that occur after tenot
omy nerve section or experimental arthritis
that in frict it is insignificant as compared
to the atrophy that occurs in these conditions

We are unable to account for the findings previous investigators who have reported muscle atrophy by external immobilization unless we assume that errors in technique are responsible for the atrophy said to have been so induced. In our experiments we found it rather difficult to obtain complete immobilization of the pelvis and hip joint without at the same time producing other lesions. In

TABLE VII -IMMOBILIZATION

		// ght	W ght	DЯ	Λt o-	t o
d		f ght	f l'It		phy	phy
mo-	D	gastroc	gastroc	(1 ss_f	P	pe
ız d	t	m	III.1	w ght)	t	
ft	4	3 165	3 173	∞s	٥	0
eft	7	2 205	2 223	018	1	I
ight	8	2 450	2 380	oco	0	0
ight	8	1 56	1 59	03	1	1
eft	10	I 54	1 59	0	0	0
eft	11	52	2 62	10	0	0
ı ht	I 2	03	20	OI	0	0
eft	14	2 107	2 128	021	0	0
ıght	14	3 62	3 69	07	2	
eft	16	2 42	35	07	3	3
eft	17	5 45	5 42	03	0	0
eft	20	2 13	1 93	20	9	9
ught	21	1 84	1 85	10	1	
ight	30	1 703	1 725	02	1	1
ight	32	2 00	06	06	3	3

ve found it almost impossible to obtain

n of the hip without causing excoria upon either the fixed or the free limb on the other hand we immobilized the cnemius we obtained fixation without omplicating factors In these experi the atropby not only was slow in ap ig—did not in fact appear until the enth day-but was insignificant as com with that obtained in experimental section tenotomy or arthritis Inas as great care was taken to obtain com immobilization our failure to obtain hy in these cases cannot be attributed dure to obtain absolute fixation conclude therefore that the atrophy ned by others with experimental immo tion was caused not by the fixation it was no doubt due to other extra factors injury excoriation etc such curred in our experiments upon the hip that for this reason we discarded as urate

e think we are therefore justified in coing that immobilization is not the cause rophy in urthritis. It does not however we from this that the atrophy that follows amental arthritis or human arthritis is lisuse atrophy. As a matter of fact, the emuscle atrophy of arthritis may well be edisuse atrophy. What we maintain is muscle disuse in such cases is not due to natary or external fixation of the limb if we leave out of consideration our obilization experiments the underlying

physiological factors involved should lead us to this conclusion

If an extremity is immobilized e.g. in plas ter we fix the origin and insertion of the muscles with reference to each other and by this procedure muscle shortening is inhibited The tension of the muscles however is still under control of the central nervous system and limitless energy may be expended in ex erting muscular force to resist immobilization Under these circumstances there is a con tinued expenditure of muscle energy to pro duce isometric contraction in the immobilized member Obviously then although volun tary shortening is inhibited when the limb is immobilized the muscles in such an extremity still continue to exercise some of their func tions Such muscles cannot strictly speaking be said to be in a state of disuse. As a matter of fact complete disuse connates complete absence of all function Hence although it is possible that partial disuse exists when a limb is immobilized it is not by any means com plete and as has been shown by our expen ments does not lead to atrophy

As a matter of fact a muscle can be said to have completely lost its power to function only when it has completely lost contact with the central nervous system. In this case as has been shown by Jamin whose work bas been confirmed by many competent observers the function of the muscle is entirely sus pended and it becomes completely related in consequence it undergoes simple atrophy and the atrophy is uncomplicated by any other conditioning influences.

The nearest approach to such disuse obtains when the tendon of a muscle has been severed In this case the neuromuscular control is preserved and the muscle continues to receive stimuli to contract either directly or indirectly through its nerve supply but inasmuch as muscle tone cannot be maintained unless the clistic tension is intact the muscle remains relaxed his therefore lost its power to function and undergoes atrophy

All propnoceptive stimuli are according to accepted teaching reflex initiated by joint motion and have their receptors not in in dividual but in muscle groups. If therefore the tendon of one muscle belonging to a group

that activates a certain joint is sectioned more particularly when the muscle whose ten don has been sectioned is only a subordinate member of the group this muscle will con timile to receive its share of tonal stimuli so long as the joint continues to be activated by the other members of the group Hence such a muscle though still receiving propriocep tive stimuli nevertheless remains in a state of relaxation and for this reason can perform no function Obviously then nerve section and tenotomy cause analogous functional dis turbances in the muscle they are both fol lowed by relaxation in the one the muscle ceases to function because it receives no more ners estimuli and cannot contract, in the other the muscle continues to receive efferent stim uli and may contract but the contraction produces no or only slight increase of tension that is only that caused by resistance of the weight of the muscle itself. In either case the muscle doe no work and in consequence undergoes atrophy Under these circum stances we should expect to meet with a simi lar type of atrophy regardless of whether the cessation of function is caused by nerve sec tion or tenotomy and this is borne out by our experiments as shown in the tables and charts which for the most part confirm those of Lipschutz and Audova

## EXPERIMENTAL RESULTS

Our experiments with arthritis again show that the atrophy that follows this condition closely resembles these two types of atrophy in practically all particulars. Only after 13 days does arthritic atrophy fail to keep pace with the above mentioned two other types and this is readily explained on the grounds that the irritation of an aseptic substance such as turpentine is limited in duration while nerve section and tenotomy produce more permanent lessions.

In our experiments atrophy was measurable after 48 hours following nerve section tenotomy and acute arthritis. After the time it increased rapidly until the beginning of the second week, when a slower rite of progress ensued. On the other hand, the atrophy that followed external fixation of the himb was not appreciable until the third week and even

then was not beyond the limit of error except in one case. One rabbit immobilized for 33 days (longest observed period) showed only 3 per cent atrophy which is within our limit of error. Obviously then immobilization atrophy is not comparable in rapidity of onset or in degree with the other types of eried

#### DISCUSSION

The more plausible theories that have been sugge ted regarding the mechanism of arthrogenic atrophy are the following

r Diminution of blood supply throu h di

Poor muscle nourishment through re flex stimulation of efferent vasomotor nerves (Brown Seguard)

3 Myo itis by direct extension (Struem pell)

4 Ascending neuritis from joint periphery to fibrous muscle sheath to neurolemma to nerves to nerve endings and finally to mu de (Decoss, Sabourin)

5 Absorption of the pathological effusion through lymph vessels bringing it in contact with the extensors and affecting them (Hoffa)

6 Disuse crused by fixation of the joint (Sulzer Burn Schiff and Zak)

7 Reflex stimulation of trophic cord centers which directly control muscular nutrition (Paget Vulpian Charcot Lefort and Valtat)

Theories one and two which make use of a blood diminution mechanism may we be here be discarded because thrombo an intobliterans and atherosclerosis may exist for years without cruising notable atrophy

Theory number one assumes the custence of joint effusion but this is not always present clinically and in arthritis accompanied by marked atrophy does not account for the fact that atrophy is common in muscles distant from the joint inflammation

Concerning theory number two it will be remembered that Vulpian by experimental stimulation of the nerve to the musculature failed to demonstrate significant control of the muscular blood vessels by them

Theories three and four those depending on direct extension of the inflammatory proc ess may also be discarded Duplay and Cazin failed to demonstrate microscopic evidence of inflummation either in the nerve or muscula ture in cases that exhibited arthritic atrophy And these theories do not account for the atrophy occurring after cases of joint trauma or atrophy at a distance from the affected joint

Theory number two was discarded by Hoffa himself when he was unable to demonstrate that the lymphatic drainage of the knee joint anatomically approached the quadriceps muscle

Theory number say is certainly untenable if by disuse is meant limitation of the func tion of the extremity as a whole. Our failure to obtain acute atrophy in the immobilization group and the physiological conditions con cerned is idequate evidence of this More over it is known that in cases of hemiologia as long standing as it years and with more or less complete disuse of the hemiplegic extremity atrophy cannot be demonstrated

On the other hand if it is definitely under stood that more or less complete cessation of function as caused by more or less complete relaxation of the muscle involved constitutes disuse these objections do not apply and disuse in that sense is a plausible explanation of the atrophy

That muscle relaxation the sign of ce sa tion of muscle function occurs after joint trauma and infection was first recognized by K is mond and subsequently described by Cas part who termed the condition muscle col Lorenz designated it as the first stage of arthritic atrophy and wrote that its dura tion may be from to 48 hours. As this con dition of the muscle for reasons mentioned above cannot be ascribed to the extension of the pathological process to these muscles it must be assumed that it is due to an inhibition or alteration of impulses to the musculature or fittage due to over stimulation

At all events it is cert in that this muscle collapse represents the earliest neuromuscular phenomenon that presents itself in arthritis ind is a condition that resembles in every particular that which ensues when a nerve or a tendon is sectioned. It seems therefore only reasonable to suppose that the atrophy following arthritis is analogous to the atrophy of nerve section and tenotomy

# SUMMARY AND CONCLUSIONS

1 The muscle atrophy that follows the fix ition of a limb is small in degree and is not appreciable before the lapse of at least a month

It is not comparable to the atrophy caused by nerve section tenotomy and arthri tis either as regards its onset or the propor tions that obtain in these conditions

3 The atrophies that follow tenotomy nerve section and arthritis are extremely rapid in onset and the progression is almost equally as brisk in all these forms

The muscle atrophus that follow tenot omy and nerve section are due to cessation of muscle function are therefore true disuse atrophies

5 The atrophy that follows experimental arthritis is preceded by muscle relaxationmuscle collapse -and the subsequent course is the same as that which obtains following tenotomy and nerve section. It is therefore reasonable to conclude that arthritic atrophy is also a disuse atrophy. The muscle disuse however is not caused by voluntary immo bilization or external fixation but is due to the muscle collapse

6 Hence the theoretical and experimental evidence leads to the inference that although arthrogenic atrophy must be considered a disuse atrophy it is not due to immobilization but is caused by a reflex mechanism

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# CLINICAL SURGERY

TROM THE DEPARTMENT OF OPTHOLEDIC SURGERY UNIVERSITY OF IOW I

# THE STRIPPING OF THE OS CALCIS

BY ARTHUI STEINDLER M D FACS IOWA CITY IOWA
P fe- 1H d fD p lm t fO lb ped S g y St t U ty fI

TI ATIVL to the treatment of cavus de formity of the foot the writer proposed and described in 1917 a method for the lief of the cavus deformity so far as it is caused the contracture of the soft structures within ie sole of the foot The disappointment which ed followed the usual methods for the relief this contracture especially of the resection of ie plantar fascia justified the advocacy of a ethod that promised more radical relief. It was used upon the proposition that the soft tissue ontracture was caused not only by the shortened bers of the plantar fascia but also by the strue iral shortening of the fibers of the short muscles the foot and furthermore of the septa which rise from the plintar fascia and which divide ie soft tissues of the foot into two lateral and onc uddle compartments These structures are not kely to yield to simple transection of the plantar iscia even though division is carried to the cleton

The method is further based upon the anatomi al consideration that the short flevors of the toes riginate at the rather cricumscribed point at the osterior process of the os calcis. These muscles ecome so intensively interwoven with the plan it fascia that simple fasciotomy does not take are of all contracted eliments (I igs. 1 and 3).

# INDICATION

The release of the soft tissue contracture of the ollow foot by the stripping operation is a symp omatic step. In cases in which the contracture is due to the shortening of the soft structures lone this procedure might be sufficient but in ill instances in which the skeleton takes part in he deformity, the latter must be handled separtely after the soft tissues have been released when the such additional procedures as wrenching instead of the case when the such additional procedures as wrenching section, wedge osteotomy of trisectomy coording to the case and the degree of the cases leformity (Ug.) It should also be realized formity (Ug.)

that the downward deflevion of the foot occurs largels in the midtarsal and in Listrance spoints and not in the ankle joint so that in most in stances the tendo achillis is not shortened con siderably and therefore needs no lengthening On the contrary in the paralytic hollow foot we find that the tendo achillis is usually lengthened and its condition is of prime importance in the pathogenesis of the deformity

It should be further realized that in parelytic cases as well as in some congenital deformities in which there is an irreparable imbalance of the muscles the restoration of form by the stripping and by the subsequent bone operation is not sufficient to assure a restoration of balance. In such cases it is quite obvious that after the form has been restored additional measures must be considered for the maintenance of muscle balance ie tendon transplantation or more frequently arthrodesis and other stabilizing operations upon the foot

#### TECHNIQUE

A horizontal incision is made over the inner aspect of the os calcis forward to a point about 11/2 inches in front of the inner tubercle of this bone Skin and fascia are divided and then the lower or plantar surface of the plantar fascia is dissected from the layer of fat throughout its full width from the inner to the outer border. Then the fascin is incised crosswise close to the point where it blends into the lower surface of the os calcis. The muscles covered by the fascia are from the inner to the outer side the abductor of the big toe and the short flevors of the toe and abductor of the fifth toe These muscles are strapped off the periosteum of the os calcis with a blunt instrument. This is necessary since other wise the stripping of the periosteum might give rise to the extensive formation of bone. It is also necessary to extend the stripping forward until the calcaneocuboid junction is reached on the

# TROM THE ST LOUIS CHILDREN S HOSPIT IL

# THE TREDET-RAMMSTEDI OPERATION FOR CONGENITAL PYLORIC STENOSIS

IN MALVIPY B CLOPTON M.D. F. V.C.S. AND ALINIS F. HAITMINN M.D. ST. LOUIS MISSOURI F. m. the St. L. Chill. H. p. 1.1. d.W. b. gr. U. 19 M.d. 18 hool

NEW operation for the relief of congenital pyloric stenosis was suggested by I redet In 1010 and the results of the operation were published by Fredet and Rammstedt almost simultaneously in 1012. Up to this time the generally accepted method of treating infants with pylonic stenosis was to do a gastro enter ostomy This gave excellent results in cases that recovered but as it required a high degree of technical skill and experience in infant surgery the mortality rate was about 25 per cent even in the hands of the best surgeons. This made the procedure too formidable for use except in the cases in which every detail clearly pointed to a satisfactory outcome and many cases in which operations were not performed because of the fear of postoperative mortality resulted in death

Since about 1915 the simple operation which we are to describe has been universally adopte l because it is easily performed and efficient and

has a negligible mortality

The diagnosis rests on the following signs and symptoms the spitting up of food beginning shortly after birth and becoming progressively worse until after 3 or 4 weeks the comitting be comes projectile the stools becoming less fre quent and smaller and in the fully developed case the gastric peristalsis with its ball like waves is evident to even the tyro. In the advanced case the pyloric tumor can be felt when the stomach is empty. The palpation of a tumor was at one time the criterion that settled the ques tion of operation but now we do not think it necessary to wait for the hypertrophy of the pylorus to become so large that it can be dis tinctly felt before advising operation because while the pylorus is enlarging the stomach is dilating and its wall is thickening because of the increasing work necessary to empty the viscus against progressive stenosis of the pylorus The late cases with large and thickened stomachs are handicapped in their recovery becau e of the time required for the overworked stomach to return to normal

Most of these cases are brought to the hospital markedly dehydrated and at times showing alkalosis. To overcome these conditions abun

dant subcutaneous injections of Ringer's solution are necessary. If athrepsia is present glucose solution intervenously or whole blood transfusion is indicated. We regard the preparation of the patient for operation as one of the most important factors in the handling of these cases. Frequently 18 to 4 hours is given to the replacing of fluid loss and the counteracting of starvation symptoms before we dare operate. Hence the big part of the battle is fought before we enter the operating room

In general the lacto s which tend to increa e the opera to ensk are (1) a di turba ce of the acid ba e equilibrium of the body (2) anhadramia (3) marked asthen a d e princ pally to malnutrition and innama and (4) the pres

ence of infection

Marked somitin hen due to pyloric stenosi cau es los in the vomitus of h frochloric ac d u ually in lar c from the body of the chloride ion is almost invarially compen ated for in a large part by retention of the licarbonate on in the I lood and tis e fluids leading to alkalo i of arving events. Such a shift to aid the alkil no side i just as serious as a commen urate shift to the a id side (acido is) if not more o Deatl may occur promptly as a re ult of collapse ce sation of re pi at on or generalize i onvul on with larin eal spa m. A de f om loss of acid ht tomiting alkalosis may be increased by any measure s ich would tend to cau e evang rate l breathin instances are commonly cen as a re ult of crying becau e of hunge pain or man pul tion. It i important then ince all of the e factors may I e present befo e during or immediately after operation to restore if pos life the ac d ba e talance of the body to it normal equal I jum Lef re operation

The diagnosis of alkalosis can be made both clinically an I clemically. In the first place alkalosis of ome degree almost in anably accompanies marked vomitin du to some type of obstruction of the gratro intestinal tract It 1 the efo e al vays expected in cases of pylonic tono i e p cially if br athing i hallow degre ed and ir e ular with frequent long approprie pages a Lurther evilence of alkalo s might be noted in the appearance of gene al Type ton city in l uch e idences of tetans as carpor edal pasm po tive Ch o tek s go or generali ed con ul ons The urme charact rist cally 1 fee from chloride (when acidife I gives little or no vit te precipitate after il e addi t r of silver mi ate) but allo co tam o little la l scarbonate (BHCO3) that it is detinctly acid (pH 5 6) in rection. The latter point is of importance. Ordinally alkaline u e will rule out the pre ence of ac dosis of any type veept that as ociated with nepl riti but acid urine not only doe not rul out alkalos's when of the type a o ated atl omiting but its p esence act ally I nl upport to tla di gno i Certain diagna is of alkalo i

4 fair and 1 poor result. In 2 ca es the stripting and wrenchin operation was 1 reliminary to other stabilizing operations with 1, d and 1 poor result.

Considering all four groups embra in or cases good results were obtained in 112 in the stripping and wrenching alone and its in 50 cases in which this operation was preliminary four realits were obtained in 5 cases of strip in and wrenching alone rife present either group while poor result were of trund in cases, or a per cent in which the strippin and wrenching alone rife present either for the contraction of the contraction of the contraction of the cases.

ing constituted the principal operation. On the other hand of \$8 eases fill groups in which the stripping and brenching were lone and preliminary operation in 50 or \$5 per cent good fresults were obtained in \$5 riper cent their sults were fair and in \$5 or in \$6 per cent their sults were fair and in \$5 or in \$6 per cent their sults were noor.

#### TAMARA

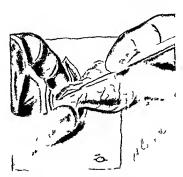
The operation results in I timbe in I a Robot correction of the cavus Kormity is fir is the off structures of the sile I file I fix to me erined. Almost all visit is the combined with wrenching of the I of timb in many instance vidge resection and ostectoms are nice size to complete the correction. I the delime I foot I urthermore the deformity will my unably recuir unless proprie measures are taken to it is the balance of the foot. Therefore in parallytic case 1 obth of the infinite and 1 justic type is well as

in the propressive types of paralysis stalilizin operations for restoration of balance become

The pox r results obtained in this series totalling less than s per cent and the fair results totalling 15 per cent were due to errors in technique as well as errors in indication. Among the latter failure of and ination with a stabilizing operation was especially cromment. It will also be noticed that there is a high percentage of fair and nor r results in the croup of the pro ressive deform ties and a fairly high percentage in spastic raraly sis In the concenital club foot group failure was due not s much to error and technique as in the c rrection of the club foot itself and was not breetly attributed to the stripping operation It vi in this group also in which the largest ercentage frecurrences was found In the cases funfantile a aralysis the failure of the operation was lue t err r in indications rather than to err r in technique and since arthrodising of era tions are terf round more frequently and the indicate n of these are I can made more liberally fe er instances if recurrence of the casus de I muits are being al served



Lig 2 Blunt his ector u ed in h iding the Lypertrophied pylonic ring



1 ig 3 Div1 on of the hype trophied pylorus with the blunt dis ector

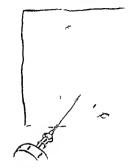
greater curvature of the stomach. This edge of the stomach is drawn into the wound with rubber covered forceps and is followed until the pylorus presents When the olive shaped hard hyper trophied mass is brought into the wound the index finger of the left hand is hooked over its upper surface and the pylorus drawn well out and held in place by the crooked finger. On the upper anterior face of pylorus there is a prac tically avascular area which we select for the incision. The incision is made solely with a blunt dissector which was originally designed as a fine dural elevator although any delicately blunt instrument will do (Fig. 2) The peritoneum and the hypertrophied muscle are as easily divided with this blunt instrument as normal tissue is with a knife (Fig 3) The blunt instrument is advantageous because it makes injury to the submucosa which is exposed over the whole are a beneath the muscle incision practically impossi ble The divided ends of the muscle are spread apart the submucosa that has been confined by the constricting bundle pouts out and the rehef of the stenosis is plainly shown. Another advan tage of the blunt dissection is that it is almost impossible in this way to divide the muscle of the normal duodenum and stomach. If by any chance this unhypertrophied muscle is cut



Fig 4 Showing clo ure of the peritoneum

bleeding results and a lighture may be required However if no damage is done to normal muscle there is almost never any bleeding

The pylorus is now dropped into the peritoneal cavity and the peritoneum of the abdominal wall is closed with fine catgut. A small spoon is used as a spatula beneath the line of suture (Fig. 4) As the last statch is about to be tied we insert a tapered glass tube and through this introduce as much warm salt solution as the peri toneal cavity will hold. When about 100 to 150 cubic centimeters have been introduced the solution begins to flow back around the sutures The tube is then removed and the last stitch The wound is sutured with catgut for muscle and fascia but we bury 3 to 5 fine silk sutures that include the muscle and fascia. We use these non absorbable sutures because under any circumstances healing is poor in under nourished infants and we have seen wounds that were sutured with catgut alone break down throughout The skin is closed with a silk stitch that includes only the enidermal tissues which in about 9 or 10 days is entirely loose and we are spared the task of taking interrupted skin statehes out of a squirming youngster To com plete the operation a small pad of dry gauge is placed over the wound and held in place by



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The operation is done on an improvi ed hot water table and the baby's arms chest and legs are wrapped in cotton wool of flannels to protect against chillin. The skin of the abdomen is prepared with alcohol.

Our choice of anaishetics is 25 per cent noto cain in normal sall solution. We use about to cubic centimeters over the upper right reclus muscle and in the muscle sheath. The injection is so done as to rai c 1 large lense lump under the shin (Fig. 1). An interval of from 10 to 3 minutes after injection permits considerable absorption of the fluid injected. The incison is then made through the redemantous tissues the pertineum being arresthetized by the forceful injection of fluid beneath the rectus sheath. No general anxishetic is used evcept that in about 1 out of 10 cases a few whifts of eith r are needed when the wound is being closed.

The incision about inches long over the outer border of the rectus exposes the lower edge of the liver which is held a ide to expose the

# IMPROVEMENTS IN PERINCAL PROSTATECTOMY PERMITTING PRIMARY WOUND CLOSURE AND HEALING WITHOUT DRAINAGE

BY THOMAS I GIBSON M.D. SAN FRANCISCO CALIFORNIA

A Slate as 1887 Sir Henry Thompson stated that successful prostatectomy was un known At that time in his Treatise on the Diseases of the Irostate which is still a classic of great value he said. I desire extremely to see such a result. I have on four occasions removed considerable portions of the prostate but without success. I have traveled considerable distances abroad expressly to a cit but without success.

The first man to make a success of prostatec tomy was Goodfellow of San Francisco (4) in His operations were performed by the perined route. Although sporadic instances of earlier perineal prostatectomics exist they were as a rule partial and merely incidental to the operation of perineal lithotomy or cutting for stone Goodfellow's technique consisted in placing the patient in the ordinary lithotomy posi tion cutting down through a median incision (Fig. 1B) onto a lithotomy staff in the urethra slipping a finger through the prostatic urethri into the bladder and enucleating the gland Although a blind operation at required but 5 to to minutes for its execution. In 1904 he re ported 7, cases with 2 deaths. He apparently was not troubled with postoperative hemorrhage and used no measures to check bleeding at the time of operation

About 1900 Proust (8) and Albarran evolved a perineal technique paralleling in ome respects the Young technique but differing in essential features and today the Proust operation has been entirely abandoned. The operation of perineal prostatectomy which is most widely practiced today had its inception with Young in 1903 (10) What favor the operation now en joys in the United States is due entirely to the work of Young who has brought it to a high state of perfection. Its main advantages over the old Coodfellow procedure are that the operative held is at all times under direct vision and the possibility of injuring important structures such is the internal and external vesical sphincters is obviated

The credit for the first complete suprapulsic prostatectomy belongs to Fuene Fuller (6 and 12) of New York and was done in 1894. His work was preceded by that of yon Dittell in 1885 (0) Belfield in 1886 (1) and McCull (7) in 1887 but these earlier operations were for the most part incomplete removals of the hypertrophic portions of the prostrue Treyer (3) of London who began his work in 1901 probably did more than anyone else to popularize suprapulue prostatectomy and claimed priority for doing a complete prostatectomy.

Foday we are interested in doing not a complete prostatectomy but a complete adencetomy shelling out completely the hypertrophic portions of the gland from its false capsule of compressed glandular fissue. The term complete prostate tomy is now used only in reference to the radical operation of Young (11) for carcinoma of the prostate

Twenty years ago the mortality in pros tatectomy was o per cent or more Today in the hands of the truncd urologist it is a ner cent or less. This is a remarkable fact when one con siders the unusually poor risks that are encount ered in the semile sufferers with prostatic hy pertrophy In the hands of the general surgeon and general practitioner the mortality of pros tatectomy is still in the neighborhood of 20 per cent. This is due to the fact that many of them are not familiar with and do not recognize the importance of proper pre operative and post operative treatment in these cases and further more they do not learn to differentiate accurately the various types of prostatism which can be done only with the aid of the cystoscope. It is essential that the type of prostatism be accurately determined so that the proper treatment may be instituted for the particular type of obstruction encountered For example in contricture of the vesical neck or median bar formation the treat ment is entirely different from that for prostatic hypertrophy yet the symptoms are identical Hunt of the Mayo Clinic has shown rather conclusively that no matter how excellent a given risk may be the patient should have at least 10 days preparatory treatment in the hospital prior to operation Poor risks may require much loncer It has been truly said The removal of the ob structing prostate is but a more incident in the treatment of prostatic hypertrophy general surgeon recognizes these facts patients with bladder neck obstructions will continue to be much afer in the hands of the urologist

means of small adhesive pla ter strips an la nar

During the operation the baby has a heleks imple in its mouth as a pacifier and in over buff of the cases does not ext at all. In mo trustances the operation takes only a few minutes and the child leaves the table looking a vell if not better than before operation.

The infant is returned to the var I in it colton wrippings and in hours i given it tes sips f witer. Two hours later it receives mall teclines which are gradually increased in the late. In fact I in a few dats the full size I lee hings are given and the infant begin it gain weight. In this ecase with the late in a himitability comiting case after operatin in it wild in the loss not increase the size of the fee line to rapidly.

In long standing, uses in which the time ach has been considerably blatel ther may be a little pitting up for a text by until the st mach regains its proper tome. The John is kept in the host stall his a long uses in necessary to get the pixture frimprocument. The infants in letter or nition for him before the end for

veck but the poorly nourished ones may have to

We have operated upon 81 cases in the first 20 cases there were 8 deaths in the last to case there have been 2 deaths 1 of the latter death being due to a pneumococcus peritoniti the other being due to a peritoritis which started from a small puncture wound of the intestine mude by a needle when the wound was being clo ed. The deaths in the first 20 cases would probally have been much fever had we under stoo I the nect sity of prep r preliminary prepara tion but most of these fatal cases had been treated as emergencies and the nece sars adjuvants deferred until after operation. Of the 8 deaths a were due to gastro enterity a to need monia and t to otitis media the others were not lefinitely explained execut as due to manition

Bowlin and D wines report results in 454 cas with a total morthity of gree eent butter in toe last rice a c a morthity of only 8 per cent. Uniter in 105 case had a mortality of 9 5 per cent. Strau reports a mortality of 9, 2 per cent which he a crile to careful prejaration with trans fust in and eluco e

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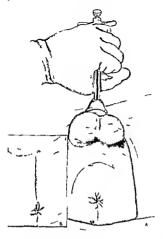
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Both the uprapulac and connect operations of pro tatectomy have become fairly vell stand ardized yet they share one fault in common and that is our present crude methods of dealing with I leeding at the time of operation Gauze packing is commonly used to obviate the danger of hæmorrhage and also listensible rubber bags I ut they loth offer the same objections (1) they tretch open still further the dilated prostati cauty which under ideal conditions should be permitted to collapse and shrink as soon as the gland is removed (2) they cause the patient dis comfort not only by their presence but by their removal as well and (3) they delay wound heal ing by leaving I chind them a temporary unnary tistula on their vithdrawal which requires or dinarily from 2 to 4 weeks to close and in some instances even longer Packing is not an ideal way of controllin hemorrhage in any operation

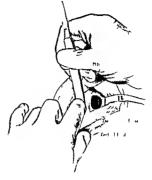
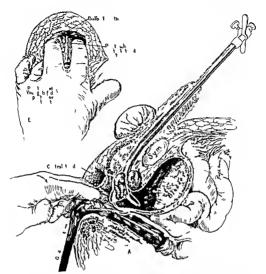


Fig. The litt the pernfill of the most of the lift of the most of the lift of the most of

and least of all in pr statectom, where un art drange acts as a deterrant to wound heal ing. In general surgical operations, packing is all sixs a last resent when other method fall it to control hemorrhage and so it should be in postatectoms also. Consequently, it is desired to present here certain slight modifications in the technique of perineal prostatectoms which render it not only simpler and more foolproof but which also permit primary closuse and healing of unusual has a thing the une of packs or begs and thereby materially shorten convalescence and ho pitalities.

Prior to operation I lood grouping and coaguliton time are determined routinely Certain prophylactic measures designed to minimize the likelihood of postoperative hemorrhage have been recommended but are perhaps of debritible value. It has I cen suggested that for 3 days prior to operation the patient be given a cup of jello taice duly and o grains of calcium lactate 3 times duly by mouth Parathormone (Lilly) 15 units may be given subcutaneously time on the



by 3. The third up in the op ration is the division of the central tundon b. If the bull and trainsver is muscles. D. During this procedure the rectum is retracted potentially visual lateral view of the perincal structures and their relations. The central tendon has been placed under tension preparators to its division. Note the Crowell tractor passing through the urethra into the bladder this tis blades opened and fortin the postate down toward the wound the symphysis pubs acting as a fulcrum. Note all of the instrument in the rectum serving as a constant guide to it focation.

day before operation. The recent work, (5) of Gordon and Cantarow points to parathyroid extract as having a possible value in hamorrhage control. If it is deemed advisable fibrogen may also be given subcutaneously and calcium in travenously. These measures may be repeated again in hour or two before operation. Anaphylavis from the use of these things must be guarded aguinst and is not without danger.

Following operation no matter what means are used to control hamorrhage one occasionally meets with a case that will give use to apprehen sion. Then it is essential with an adequate syringe to keep the bladder and retention catheter free from clots to repert the measures above out lined and in addition to try injections of enhedring.

or pituitrin subcutaneously Sodium citrate given intravenously is said to shorten coagulation time Plenty of fluids by hypodermoclysis and rest ob tained by morphine are essential if there is post operative bleeding. The bladder may be flushed with a warm solution of potassium permanganate 1 4000 and if necessary an instillation of 10 per cent antipyrin solution may be given Irrigating the bladder with a 2 per cent alum solution fol lowed immediately by an instillation of a ounce of 50 per cent aluminum acetate mixture which is retained often serves a useful purpose permeum is tightly compressed with a double spica bandage a roll or two of rolled bandage being placed against the perineum to exert ad ditional pressure Intramuscular injections of



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while blood seem occasionally to be u eful. It may in rare instances be necessary to re-pen and rack the w unlivendal a last re-ort to give a littran fusion.

On the morning 1 operation b 1 re the jathent let ve his 70 m thou rethra and bladder are thou his remarked with a 4 jer cent lation of 1 ret acril 1 illowed 1 v the m tillation of 1 outs of 5 per cent at vol. Cas an low year una, thesix 1 given those patient who lo not vish to 1 e present at their on 1 pration inherities spinal anesthesia 1 u ed in most cats. For spinal anesthesia cubi centimeters of a 5 jer cent olution; allo aine (Lumiere) with the a ldtt in olution; allo aine (Lumiere) with the a ldtt in

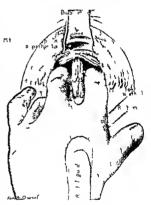
of adrenalin i i leal

The next ter fimp rtance in Lerineal Dris tate t my t the patient of the patient. The ordinary lithotomy to ition with feet in stirrup exactly as u e l by the gynecolo ist f r va mal reja is entirely adequate for an excellent c po ure of the pro tate. The or erator can sit an I v rk at ea e The buttocks must project lightly levon the end of the table oas not to interfere vith the retractors. The perincal board an l other p cial apparatus de igned to improve the exposure of the rrostate I regard as totally un nec s ary encumbrances which only add to the complexity of the operation and the di comfort of the patient. The perineal board was on, in ally devised by Hal tead for rectal w rk and adopte I by Young for perineal prostatectomy. It served a u eful purpose in the developmental phas s f their work but no in the li ht of m re definite anatomical knowledge and establi hed sur ical procedure it i not essential. The hips can be flexed just as completely s ith the patient lying in a comfortable horizontal position as by standin him virtually on his heal on the perincal board I can see no advantage in any type of permeal elevator Even sandbags are unnecessary

The technique followed in the operation is es cutrilly that of Young with minor change which will be described. The accompanying reproductions of drawings of an actual operation render superfluous detailed description. Figure

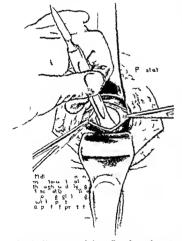
and 3 illustrate the primary incision with the Crowell tractor in place the penetration of the ischiorectal fassa on either side of the central tendon and the livision of the latter structure

We now approach the crucial part of the open to no which is the Waterloo of the novice. It must le con tantly borne in mind that the rectum is always in close proximity throughout the erpoure of the prostite and that it is held an territy against the posterior surface of the gladby the ricto urethrali muscle. This muscle is not a distinct entity but represents merely the attachment of a porti not the Inaquidinal



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muscle fibers of the rectum to the region of the apex of the prostate so that at this point there is no definite line of demarcation between rectum and prostate. To facilitate the exposure of the prostate at this stage without dinger of injuring the rectum a rectal guide (I ig 4) has been de vised. For an expert perineal surgeon it may often be superfluous yet it may prove very comforting at times. With the urethral tractor on one side and the rectal guide on the other (Fig 5A) the surgeon is guided unerringly to his destination just as a ferry boat is cuided into its slip by the bulkheads on either side Thus having ones bearings it is easy to make a small midline slit through the recto urethralis near its attachment to the apex of the prostate (Fig. 5) grasp each side of the opening with Allis forceps and slip a knife handle down over the posterior surface of the prostate between the lavers of Denonvilliers fascia (Fig 6) This opening is enlarged enough



ing (I fee mare n of the mull ne sit in the rectoure that he are grant of and his force and a line feel and exhibit some of the protite between I have of De on with reference of the protite between I have of De on with reference of the protite gind. The mooth gitten g grant has the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the postate in the line with the surface of the line with the surface of the line with the line with

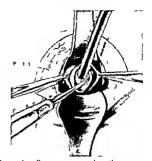
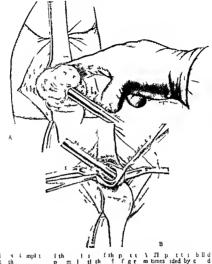


Fig. 7. Amillin. inci ion 1 mide in the pr. inte onto the instrument in the urethra. This inci ion is xiend of to rid the base of the pro tate and do s not approach too closely the apex where the external ve ical phiniter lie. The plane of cleavage between capsule and prostate 1 now re-caled and enuclection is begon with the kocher. In sector 1 first 1 cop ide of yeld ent the Crowell tractor 1 removed and right e l by the short koung prostatic tractor 1 then 1 pa. of through the wound into the bla [fer and it is bla les opened so as to aid in the enucl att in by ling in the pro-tate into the wound

to permit a midline incision through the prostate on to the instrument in the urethra (Fig. 7). This incision is between the ejaculatory duets and apparently does no harm either to the ejaculatory duets or to the verumontanum. Following prostatictomy cystoscopic inspection of the posterior urethra in two cases has shown a normal looking verumontanum and sevial potency has been preserved in a fair percentage of cases. As a matter of fact injury to the verumontanum is probably of little consequence and I recall one instance in which the verumontanum was accidentally removed with the prostate without loss of the sevial powers.

As has been shown the operation following the cutting of the contral tendon has been connied strictly to the midline and thus the nerves and blood vessels which course Interally are avoided. The enucleation of the prostate is accomplished as shown in Figures 7 and §A. Since the whole field is under direct vision, there is practically no danger of leaving hypertrophic remnants which might lead to recurrence.

With the prostite removed we now have the condition shown in Figure 8B A smooth round snug internal sphincter is usually left following the conclection. It is beneath the edges of the nucosal flap that the chief blieding is apt to



1 * Complet fith 1 1 fith pett Milpettiblld the pm 1 tith 1 fgrom times ided by c d so b that tet til the prost tecap 1 foll g latab pit f } 1 d B dm tet dt libid g tid ihrt

c ur In the 1 ast 1t has been the cu tom of the surgeon in his inordinate hurry to complete the perati n t insert gauze packing immediately after the enucleation and to close the wound without any special effort to ascertain the nature Probably most prostatectomy of the bleedin patients would cease bleeding if nothing were done but it is not safe to leave nature to its own devices Why not take 5 minutes at this stage of the operation to stop any bleeding and if possible to avoid the use of packs or bags? The bleeding urface is under direct ision in the perineal op eration and can be thorou hly inspected with th aid of a Specight a Cameron light or some other means of illumination Spurters and bleeding points can be readily caught with a hæmostat and ligated Oc asionally a suture in the flap of resteal mucosa will check hamorrhage. A mat tress sature of the po terror lip of vestcal mucosa to the prostrict cripsule is sometimes used with good effect becaue it is there that the mot trouble ome bleeding usually occurs. The Youn boomeran, needle is useful for this maneuver for general oozing, stick sponges saturated with hot sterile. Monsell's solution of 10 per cent strength upplied to the oozing surface are extremely sati factor. This solution has been used at the su gestion of Dr. Henry, Mever of San Franci co who his used it for 15 years in sur japule prostitection, with good results and without causing any upparent injury to the tissues or dely of wound herling.

Once careful inspection shows that all bleeding his ceased it is then safe to dispense with packing or bags. The wound is closed as illustrated in Figures 9 10 and 11

After returning to bed the patient is routinely given 1000 to 2000 cubic centimeters by hypoder mocks is and the urethral eatheter is connected with a Connell suction apparatus in order to keep the bladder drained dry and to keep urine off the healing wound. The Drus bottle Chapman filter pump or any other type of suction apparatus which does this satisfactionly may be used.

Abstracts of 4 representative cases are appended Croses 1 and 2 show what may occi sionally be accomplished by the old method of routine packing and draininge. In Croses 3 and 4 the wounds were closed without pracking or draininge according to the technique which has been described.

Case T C P 69 years of age had a moderate siz d glandular type of hypertrophy removed by the perinar route Spinal anresthesia (allocain) was used At it close of the operation a 81 cuttleter was passed to it blidder through the uterthra and a 281 it rough the vound to the lidder. The protatice fos a vas packed with 2 inch pague strips and the wound closed as shown in Fujures of and after the pritent as taken to his room a Connell uction was tarted. The gair pack and perinael acid eter were removed in 48 hours. The patient sat up on the fifth lay and began alking on the seventh d. The urethral atheter as removed on the ninth day. There as no language through the perineum at any time follo ing operation in pite of the fact that the wound had been during the principle of the packing and the perineal tule. The patient was dictarged from the bosy tail on the fifte mit day after operation in excellent general condition. If wound lad healed solidly without any reaction and there sign of furnitions control of uniation.

Case R M years old tad a small adn rentme ed from a md glandular type of Inpertrophie prostate removed under spinal an othe in (neocam) Urethral and per neal catheters to etter wit a nace packing is e e u ad a m C ser Connell suction was u c'l cont mu usly to keep the bladder dry folloving, operation The perincular tert and packing were emoved in 4 Iours. The urettr I catheter was removed on the sexinth day after operation and the patients tream to get up. Y no time vas the e any leaka e furine through the perincum. Hower a mill it the deputh mit we thought exceur to court d

the result is the of epidit with without lever occurred to the prittent was not allosed to least the hope I in that it is to see and lay after operation.

Cast 3. C. B. (3 years of 1 h. d per neal rest et my

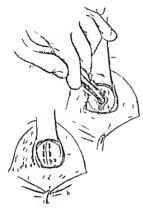
of the distribution of the



 $\Gamma_{b,0}$  Dramage is provided via then turn't channel by means of a 28 I cath eter passed through the ureth a union the bladder. Use and extincter through the wound to the bladder use used only in the exact such that it is necessary to rest to prack in, to control! morning

Case 4 O I of years old I all large Handular type I (notate removed permently und r spinal anestheria tailoca n). The wound was closed vithout packing or de inage as shown in I ig 10b. I retention catheter was pilled through the irichtar to the bladder at operation and Council suction was constantly maintuned until the centil day after operation and the patient got up out of I Tile ound lealed programs without the slightest redns so reaction of any kind and the patient as discharged from the bo pital on it willth day after operation in good condition and with good control of urin tuon

If procking is used it is only in rire cases that primary healing without urnary drainage occurs is in Cases rand 2. In general to 4 weeks are required for a urnary fistula to heal. All of the cases in which bleeding has been controlled with out resorting to procking and in which the wound has been tightly closed without the institution

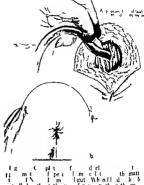


is Sight mild firild fill by the fill sight to the fill sight to the fill sight to be filled as a filled as a fill sight to be filled as a fill sight to be filled as a fill sight to be filled as a filled as

f dramage as in Cases 3 and a have healed ber brimam without subsequent breaking down. All f the cases reported have had infected urine I ollow up records in these 4 cases have shown in excellent ultimate result. Cloure of urmary yound vithout drainage i contrary to one of the oldest axioms of surgery yet in these cas s e ha e in outlet for drainage throu h the n itural channel and experience has now shown that this can be safely done in many cases without jeopardy to the patient at the same time shorten ing his stay in the hospital saving dressings and idding to his comfort while there Termeal rostatectomy ordinarily requires 30 to 45 minutes actual operating time Why not spend in extra 5 minutes in the systematic control of l leeding if it will save the patient weeks or more in the hospital?

## SUMM AT A

r Prostatectomy is still a relatively recent levelopment in the field of surgery having first



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been successfully performed by Goodfellow who legrn to do penned prostatectomic in 1891 Suprapulue prostatectomy has an even more recent origin as the first successful operation of the type was performed by Fuller in 1894 and popularized by Freyer in 1901

The great reduction in mortality rate which chracterizes prostatectomy in the hand of the trained urologist today has been achieved as a result of more accurate differential diagnosas and fuller reliaration by the surgeon of the importance of thorough pre operative and post operative treatment berring, in mind that the operation itself is but a mera incident in the treatment of a prostruct hypertrophy.

3 In spate of its present high plane of achieve ment prostruction. both suprapulue and pen neal is subject to certrun defects claif among which are our present crude method of controlling bleching by the ne of packs and bags of virious sorts. Such subterfues are re-arded only in a roour of last resort in other suggectal operations and this should be particularly true in

prostatectomy in which they delay wound healing and encourage the prolongation of urinary drainage

- 4 Modifications in the technique of perineal prostatectomy together with methods of dealing with bleeding are outlined which should in a high percentage of cas's permit primary wound closure and healing without urinary drainage and thus add materially to the brevity and comfort of the prtient's stry in the hospital. The tech nique employed is ess ntirily that of Young ex cept that the patient is placed in the ordinary lithotomy position a special instrument is in serted into the rectum to guard against injury to that structure a midline incision is made in the prostate which permits easy closure following enucleation under careful visualization bleeding is entirely checked by suture and sponging with warm to per cent Monsell's solution and the wound is closed tightly in layers with mattress sutures of No 2 chromicized gut without drainage. All drainage is taken care of by an adequate suction apparatus attached to a reten tion catheter in the urethra
- 5 Four illustrative cases of perineal prost attectomy are reported in which healing occurred per primam without urinary drainage through the wound at any time. Three of them were discharged from the hospital a weeks after operation in excellent condition. The fourth patient was not allowed to leave the hospital until 3 weeks after operation owing to the occurrence of a mildistrated of epididy mits.

It is hoped that this contribution will mark a new epoch in prostatectomy which will bring it a step closer to the goal of an ideal operation

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# THE CANCE TERMINATED BY CÆSARI AN SECTION AT THE FRETERAL IKANSPLANTATION INTO THE SICMOID

R CALL W FRERBACH M.D. FACS A DIAMES W PHACE M.D. A. A. BO. MICHIGA 3 101 b D F tty 1 t fal be

HROL( II the increasing succes in the tran plantata n of the ureters into the sig m id with the adoption of the general principles put f ry and by Coffey there is rapidly urpearing a relatively large group f patients reacts n t pregnancy operation and lihas n t been frequently ob erred the feel ther f re that any contribution we might ad l

it this time mix be of value

Until recently bilateral ureteral tran ilanta tion had been fone chiefly fir the relief of con genital 1 t mitte while le s commonly inoper alle urcteral vesicovaginal fistula cancer of the Hadder and tubercul sis had been treated by

the or cedure

In the University Hospital we have hid 6 ca s f exstriby of the I ladder r epispadias lumn the on this years which required urcteral transilintation. I ourteen of the e were operated upon while it were under 5 year fage and it eeme l advi alle to postry ne operation. One ratient as to years fa and a dancerous risk It i interesting that i patients vere females and ta were males. Statistics from all other sources how that there 1 a marked predominance of males In addition to the group of cases with con...enital deformities. Cabot has transplanted the urcters in ne cas f cancer of the bladder in t vo with irreparable dama e to the urethral sphincter and in a fourth with intractable bladder ain Peterson ha recently reported two cases of increrable esic vaginal fistula treated in this manner One of u (CWE) transplanted a single u eter successfully for tuberculosis of the kidney and Hadder Of our a operative cases o were a lult females all of whom might lecome renint It i this gr up with which we are here chi ils concerned

A review of the literature shows that pregnancy in pitients with exstrophy is not as uncommon as might be expected. Miller and Long discovered 14 rep rted cases up to 1018 Sage has since idded another. There are only three cases of pre nancy reported in patients with transplanted ureters One of these terminating in the birth of t ins was reported by Charles Mayo a s cond as rej reed by Knauf of the Mayo chinic the thid a recently observed by \ B Green Armyti He successfully delivered a normal child by casarean section in a patient who hall had ureteral transplantation done 14 years before by the Leters method. We add one case to the

In operating on our patient we observed the principles set down by Coffey for successful transplantation of the prefers. Then h Coffee C H Maso and Lower prefer the intravelvic at or ach we feel that the extraperatoreal method safer and give equally good results. The changer of infection which I ower emphasizes in practice is not great. Ameteen of our cas swere ik ne hy this method during the past to years with ut serious infection. There was one oper tive death from unexplained rectal hamorrhage

in a patient of Si years We use the following technique as a rule The ureter is appreached through an oblique split mu cle incision the right side always lein done As the peritoneum is stripped from the pelvic wall the ureter will be carried with it. It i nicked up at the bifurcation of the iliacs and mobilized to within a centimeter or two from the bladder then cut across as low down as possible The distal stimp 1 tied 1 5 centimeter pen toneal incision is be un at the point opposite the fixed portion of the irreter This will prevent

kinking over the edge of the peritoneum Alloop f signicid is drawn through the peritoneal open ing and a 3 centimeter incision is made throu h the kingtudinal muscular band to the mucosa The mucosa is then easily stripped lack a centi met r on each side and a bed is prepared for the ureter The preparation of the end of the ureter and its implantation into the bowel priceed a de colled a frequently by C ffee and C H Mavo In the closure of the muscularis over the ureter ve modify the technique sightly. It is impossible to compres the ureter imunst its mucosil bed by rolling in ter much of the wall of the lowel in an effort to seal the wound the point a here the uniter enters the mu culan at the proximal end of the wound however it may easily be shut off by drawing the full the k ness of the intestinal wall over it Coffey s tubes temportraly avoid this as does the strand of cat gut used by C II Mayo It may allo be avoided if the closure of the musulari is dic ntinue just at the paint where the ureter enter it



I h r the aldominal all and reterral generals which there are an ect in lor full term preparate in a jatient who h I had the ureter tran plante I into the ignored 4 years b for

Since a leal here is possible though the fireful tube is kept in the bowel for a tex days after operation we allow about a centimeter of the bowel to remain exposed extraperstoneally and send it off by suturing the peritoneum to the intestinal wall at one or two points. This also is trest to fix the bowel and prevent pull on the ureter. The rest of the bowel is returned to the peritoneal crysts and the peritoneum is closed over it. A small gutta percha drain is left in the wound after it is first carefully washed out. Irine usually appears in the rectum at once. In a week, or two the patient is ready for the second stage.

After an operation of this type our patient was promptly restored to society and within two vears we were faced with the problem of marriage and later pregnancy. There were two important sources of danger One the deformity of the pelvis the other renal damage due to the m creased load under abnormal conditions. Williams says of split pelvis Owing to the descent of the promitory of the sacrum and the absence of union at the symphysis there is marked trans verse widening of the posterior portion of the pelvis while the anterior portions extend more or less parallel He also observes that for practical purposes the pelvis may be considered as gener illy enlarged the dystocia being due to abnor malities of mechanism resulting from the abdo-



Ing 2 Same a patient in In use r showing d tail of e term digenital deformity

men of a resistant anterior pelvic wall Jellett agrees that little or no difficulty is experienced during labor in consequence of the absence of any resistant force. Miller and King however found among their 14 cases recovered from the literature only jour with fairly easy deliveries.

A brief report of our case follows

Four year ago Miss I S (1203)5) ag d in year was admit d to the Un ver its Ho pital for treatment of ex trophs of the bladder. Blatteril trun Janatation s as lon I; one of us (C W. E.) n two stages as described fibe; attent recorred without difficulty and married and ithin sea in Nugust 1927 hir entered Ith Un ver its Ho pital p egant at term. The abdomen slow d it normal distention of a full littm pregnancy. The umbilicu

not peent 'wid frm' loo' milline car marked the tof the extraph ted bladder. Then to o hateral operative cars through which the tran plantation of the uctrivate with extraphentation of the uctrivate with extraphentation of the uctrivate with the milline put lelow the firous symphy and urround d with directifue with the cartiue was the ina which

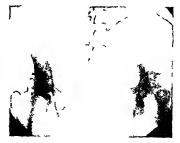


Fig. 3 Ray of patient show in Figure 1 and 2 Not the players 1

# THE PATHOGENESIS AND THE SURGICAL TREATMENT OF GASTRIC CRISIS OF TABLES NEURORAMISECTOMY¹

BY I UDO LAN BOT AIRT MID AND JEAN LIRBRUGGE MID ANTHER BELCIUM

VISCER LL PAIN

CONCEPTION of pain the most human of sensations is the least well established To outline the theories concerning it would require pages therefore we will present only a few elemental points necessary for an under standing of certain attempts in modern surgery

A preliminary question arises. Are the viscera sensitive? Lenander says that the vegetative tibers do not conduct painful impulses there is pain only if the sensory nerves are irritated through the parietal peritoneum Mackenzie also believes that the viscera do not have autono mous sensibility but that s assations are prosected to the surface. Head believes that the viscera have protopathic spatial diffuse sensi Kappis thinks that the p ritoneum the omentum the tissues which separate the organs especially that which surround the vessels are s native to pain while Bruning Goldscheider and Breslauer believe that visceral pain originates at the level of the organ itself

That a viscus does not react to a prick a burn or some other kind of stimulus does not prove that a nations of pain cannot take place in it but simply that the adequate stimulus has not been

applied

A point on which everyone agrees is that in order to provoke a painful sensation one must have an adequate stimulus qualitatively and quantitatively abnormal taking place at the level of the organ itself or of its afferent nerves. At the level of hollow organs, the those we are interested in this stimulus is most often distention (Briscoe I smein Lutembacher) spasm inflammation (Lemaire) or anæmia (Nothnagel). Distention and spasm are intimately associated according to the law of Bayliss Starling. All contraction of the preceding segment of the preceding segment of the preceding segment.

Abdominal irritation manifests itself by two types of pain. One in the organ itself which is more than discomfort and another at the surface of the body, which is a true painful sensition. The second type the referred pain—localized most often in the corresponding cutaneous territory or in a more distant segment of the organ in which case the determination of origin is more

difficult (Forgue)

The connections of ganglia of the sympathetic chain with the spinal centers explain the reference of pain in the metamere and the displacement undergone by certain metameres during the evolution of the body explains certain paradoxic types of referred pain but not all of them. The visceral excitation expresses itself by pain in the corresponding segment. The surface corresponds to the zone of Head

Mack enzie has clearly demonstrated the reference of pain to the periphery and his schema of ronduction is well known. This viscerosensitive reflex which is not a reflex in the physiological meaning of the word takes the route of the cord. The English school of physiologists headed by Langley and Gaskell agrees with the clinicians.

on this point

The course of the sensory fibers is the same in all sensors nerves that is direct to the cells of the ganglia of the posterior root without synapses in the peripheral ganalia. This touches on the much discussed problem of the central pathway of the sympathetic fibers Mackenzie I angley and Gaskell believe that this connection is through the spinal cord the sensory neuron has its cell in the spinal ganglion and is connected with the sensory fibers in the cord through the posterior This conception is the most frequently accepted and seems to be confirmed by the work of Edgeworth Koelliker and more recently of Danielopolu and Lemaire basing their opinion on the morphological data of Ramon y Cajal Dogiel Edinger believe that the synapse is located at the T cell of the spinal ganglion The problem remains undecided but most of the recent investigations seem to confirm the conception of Gaskell (Ruiz Arna)

The recent experiments of Lemaire on the dis appearance of certain visceral pains after the sensory neuron of the corresponding metamerchas been an esthetized adds support to Mackenzies ider the abolition of sensibility in the area of reflection immediately suppresses pain of the viscera. It does not prove that the relay between the sympathetic system and the cerebral nervous system takes place in the spinal ganglion. Admitting that this synapse has been demonstrated histologically, how could a referred pain be produced by direct irritation even if the impulse travels in a direction opposite to the



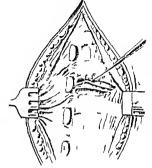
inn ti nal golarizati n of the oil. The experiment of Lemiir prives and this important that the function dintegrity of the oil heterosystem is indipensial being the explanation of visceral pain

Although we ref up fr m ub col m, t inv ne f thes 1 mm ns on the que to n w suggest an suble concepts not the much mi mef visceral pain an a lequate peripheral stimulus reache the cord put it in a state factivity which serves to provoke exaggerated met r reacti us in the organ concerned leading to hyperfunction which rapidly exhausts it Soon the muscle of this rean ceas t ile excitable the visits becomes di tended, and the distention constitutes an olstai t the passa e of the impuls l lockin of the impail es o erloads the afferent sympathetic system and results in stimulation of the c rre p nding pinal segment expressed as contractur and rain in the respective metameres. The pr longe I excitate n f the spinal segment leaves behind it a state if keal hyper excitability

This abbre lated sketch remits a letter unler standing of the mechanism of gastric pain

#### CA TRIC PAIN

Pan originating in the janctal peritoneum is transmitted by the inter ostil and phrain energes. Pain of the visceral perit neum is transmitted by the major splanchim energe except when it is in the descending color and the sigmoid when it is carried by the minor splanchim nerve. The painful sensitions of the stomach piss over the vagus (Max Kappis and Shauker). Operations to relieve gestic pain have neces



The tile that the method of took Th

econcerning the confluction of visited pun that is the possible site for operations to relieve pain rings for the peripheral neuron up to the central nervous 50 km.

To relicac visceral than Lemine treated the single in its medically Jabouity attracked the peripheral gan his vith varied results. Dan islojoul lirected his effects to the radicaln's gment Sieral and vin Cara soon alandoned their efforts to obtain results by operation on the spiral ganglia. Van Gaza and Lenche dee indeed entitles on operations on the runicommunicalities. Frazier Souther Lorester Search de Martel and Pobineru are all attempting to rehere pain by severing juthways in the spiral certal. This migration from the jeruphers toward the enters marks the actual evolution of surgery of the sympthetic system and of the surgery of puin.

#### THE SYMPTOMS OF GASTRIC CRISIS OF TABES

Notwithstrading, the frequency of tabes a serious chineral study of gastrid prun in the ext es offers interesting fact. One of us (Van Bo nert) has hid the opportunity of following a great number of cress of tabes in a deptatement syphilology of the Belgian Stite and of coll citing numerous histories.

PAIN

Clinical observation allows the grouping of the thoracovisceral pains in three categories

Pain with melameric topography The onset of the gastrie or intestinal crisis has in a great number of cases of tabes a definite radicular character Pain starts in the back near the verte bral column it radiates laterally and reaches the epigastric or subumbilical region. There ire lightning like pains which follow each other rapidly for a rather short time occasionally for a few hours The seat of the pain is deep and definitely localized The pain introduces or ends the true gastric crisis and is the thoracic equiv alent of radiculitis of the sciatic type in the lower limb and of the cubital type in the upper limb Study of sensition shows objective disturbances of a radicular distribution hypoalgesia or hyper algesia of the metameric are is corresponding to one or several roots

The following case illustrates this kind of pain

Can: A woman aged 38 se is received the initial syphilitie infection in 1905. Shooting pains were first lit in 1018. At this time the patelliar and ankle jerks of the upper limbs were abolished. There was great ata is Romberg's sign was marked. Radicular pain core ponding to the see enth eighth unith and tenth dorsal eigenies vas present on both sides. Hype resthesia to pain and to both was marked and the patient made mistales in thermal appreciation. Myosis and an otomar pre in tile right pupil being larger than the left. The publis reacted to light and to accommodation. Two gasties cancel with a discourance of the patient and to a commodation. Two gasties cancel with a discourance of the patient in 10 3 and 1914.

Sympathetic pain en nappe In other cases, on the contrary pain occurs spontaneously in areas of variable extension and indefinite limits without radicular or neuritic distribution. The pains are continuous superficial and undergo spontaneous exacerbations they give the pritents sensations of contusion constriction or crushing and resist most of the analgesic measures. These sheets of pain are usually situated in the epigastrum sometimes at the level of the left hypochondrium occasionally surrounding the right shoulder and in some cases in smaller pitches near the vertebral column.

During the periods of extreme pain the pilo motor refleves are very acute the patient screams at the slightest touch. At the level of the pains one may observe distinct red vasomotor lines. In certain cases the injection of pilocraptic in creases the pain and in two of our cases provoked sudation over the hyperalgie area.

Chincally these pains recall the true sympathal girs and although we teserve judgment as to whether or not there is a pain belonging specially to the peripheral sympathetic fibers we believe that it is possible that they have their origin in

the irritation of the afferent path of the sym pathetic system The following cases illustrate pain en nappe

CASE 2 A soman aged 46 years gave no history of her ditary syphilis She had given birth to ten hidren six of whom were hing and well there had been three miscarriages. The data of syphilis infection was not known. The present illness began 4 years previously with headache and diffuse pain of a rheumatorit type aff cting the superior and inferior limbs. The chief complaint were shooting pains trouble with hearing, slight dysurvand decrease in vision.

On examination the patient's walk was found to be slightly player and stiff. There was marked tremor of the upper limbs and of the tongue. The tendon refl. eso of the upper limbs were well marked on both sides the patellar and ankle prists were abolished. At the level of the lower limbs and in the subumbilical region there were di turb ances of deep and superfineal sensation especially taxtile and thermal. There was a degree of sensitiveness of the bone. Parovysmal pains en nappe of a sympathaligie character occurred in the region of the epirastrium and of the left hypochondrium. Pranail pain was present. There wer areas of hyperasthesia to touch and pain at the level of the sacrum and in an oval abo etile left breast. The meetion of 40 per cent jodized oil showed that there was no obstruction in the spinal canal. Myosis and an ocoria were present, the right pupil being larger than the felt and tirregular Reaction to 1ght was abobiled on both sides. The Bordet Was ermann test was slightly pour time in the blood.

The state of the s

Shaw also distingu hes a dull vague and constrict e t a n which does not correspond to the sympathetic pan just described and which does not disappear after potenor radicatomy

Deep gastric pain Deep gastrie pain has been well described and is known to all clinicians. The prinful reaction is intimately bound up with sensory motor reactions (nausea vomiting and gastric hyperkinesia) but pain may exist alone and in that case takes on the aspect of true classical splanchnic crisis.

#### DIGESTIVE SYMPTOMS

Nausea and vomiting are the predominant digestive symptoms. The nausea may be extremely to keep the property of the property o

troublesome it may occur alone for several bours before the painful crisis or the virming itself may constitute the entire gisting erisis the vomitus being finally reduced to bik tinged system time termineases nauserus essociated within it une hemicrama with terebrating prin in the temporo jurital region intense and full occupital prin recelling at times that of tumpr of the posterior certified foss. One of the jutients or whom we operated had been complaining of piusa alone sometimes persisting for 3 or 4 days.

Ordinarily in true gastric crisis \ matin, is n ir minent symptom it is uncontrollable some times spasmedic and coincides most often but it talways with a nauseous state. Sometimes one meets with mauser without comiting and less exceptionally with violent pain not associated with ear in entol rance.

The muchanism of the muting is complex in a certain number of cases we have been able to enfy on the fluoroscopic screen existence of spasm of the pylorus with intense peristalsi and antiperistal is so marked as to force the cardia alm st mechanically. In other eas a however there was a flask st much. The naus ous excitations may le lulbar in origin and indeed it is difficult to idmit that increase in abd mino diaphragmatic pressure by radicular irritation may not by itself precipitate the rellex of vomit ing These cases are excention if an 1 in the major its of instances digestive hyperkin sis is the rule One frequently observes prolinged spisms of the small intestine and of the right colon and c n stipation is often noticed

#### HICCOUGH

Hiccough is relatively rare in the very painful forms of crisis with vomiting and in the crisis of nausea. A typical cas is reported in which the gastric crisis manifested itself only by deep 1 in the right hypochondrum a dull iche in the right shoulder and shoulder blade and persis ent hiccough during several days resisting all therapeutic measures. The crise has been fol lowed for 4 years and not once has there been any vomiting or nausea.

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il am sy ir mexcptil tin them teecis ar littlift fthe ckas will the peratio get femelik lik lill ir ppead normal all it gt lyp kie wr

#### NI UROSI CITATISI TROUBLIS

The gristne crisis of tabes is essentially an imtrive syndrome of the afferent gastrie paths and therefore the two great vegetative arches the sympathatic and the vagus must be considered in dealing with the disorder. There are two great varieties of gristric crisis of tabes sympathetic and agal. We were interested in determining there is a particular mechanism for each vaniety and consequently a particular form of treat ment.

Does the state of the patient's vegetative system precipitate or influence the course of the viscoal erisis? The question is not new Whart Lew and Harts, als have described a sympatheticotome form of tabes with arthropathy viscoral ansathesia permanent techneration and abolition of the coulo arthric reliev. Harvier believed vigotional was responsible for the largin ospasms add minnal print paroxysms with suilorthead gas to the largin ospasms and minnal print paroxysms with suilorthead gas to the largin ospasms.

We have tried to review this question six teminically. One arrees with most of the chinicans at 1 is in considering the vegetative equilibrium of an individual at a certain time as the express on finite, rative action of the sympathetic and parisympathetic nervous sistems (Danelopola). The pathological vegetative phenomena result from a series of disturbing factors includin (i) a modification of the normal amphotropism of the medium (i) a local lession of tho organs (3) a lession of the extrasseeril or other efferent ner vous paths table to influence the vegetative functions and (4) the functional state of the afferent mults.

It is exident that the last three factors play a manifest rile in tabes. The lesions of the organistron, influence, the local tonus the terminal gain in the sympathetic or parasympathetic endings and the interview of the context and of the paths which join the cortex and of the paths which join the cortex to the vegetitue centers modify the reactions of these patients. It is evident that one cannot appreciate the value of each factor separately.

We have chosen three tests two very reliable ones (administration of atropine) the other more complex and less conclusive (intravenous injection of epinephyne)

The courses of four cases have been studied for more than years three of the patients were amphotomic and one vagotomic. The behavior of the amphotonic patients followed the rule formu lated by Danielopolu In amphotonia the hyper tony predominates upon the excitors whether they are represented by the sympathetic (heart) or by the parasympathetic (digestive tract) In two of these cases studied during gastric crisis it was seen that the amphotonia was increased for the two groups except for two symptoms for which we see no explanation arterial and venous hypo tonia. A patient of the vagotonic type behaved during the crisis like an amphotonic patient with What pric sympatheticotonic predominence tical data may be drawn from these laborious researches of which we shall not give all the details? The facts are interesting in themselves as they show the unruliness of the vegetative system during the visceral paroxysm but it shows also that it does not always influence the vegetative reaction and that consequently no matter how detailed these data on the veget itive system are they cannot constitute a criterion in choosing whether intervention shall be in the sympathetic or vagal system A few clinical signs which we will mention seem to us to be of greater value

The pharmacody namic tests are no more find Crises which are releved by epinephrine are sympathetic in nature (Heile) those temporarily relieved by attopine are vagid in nature (Thomsen) However in experimenting on cases chosen because they are rather definite clinical types of vegetative disorders we have been surprised before beginning our systematic research to find that within a few days the same patient had been helped and made worse by epinephrine given under almost analogous conditions. For this reason we have abandoned pharmacody namic tests to determine the type of intervention

We wish to compare some of these clinical facts just reported with a few data found in the litera We have shown that the radiculogastric evolution of the crisis has been remarkably well described by Head and Fearnside On the other hand Forrster Cotte Jean Critchley and Wolfsohn have differentiated the vagal crisis from the sympathetic crisis in experiments on the biological reactions of the fastric juice and it is evident that a similar interpretation should explain in certain cases the benefit obtained from radicotomy and vagotomy and in certain other cases the complete failure In a recent work Poerster insists again on that differentiation and its importance in deciding the type of operation He would utilize the radiculospinal operation for

the splanchmic crisis and section of the sensory root of the vigus (technique of Foerster Luettner for the vagal forms. The tenth nerve has a mixed sensory and motor root

Since 1911 Toerster has suggested the importance of the phrenic nerve in certain gastric syndromes of tabes. More recently he has completed his research and has concluded that affection of the phrenic causes a special type characterized by pain in the shoulder hyperalgia of the neck- and incough. This form does not include nausea or vomiting. Case 4 of our series justifies the separation of such a type at least from a clinical standpoint.

The general impression which we can draw however from our obstrations is opposed to a too strict epiration of the different types sympathetic vagal and phrenic. In most of the cases one finds symptoms belonging to three cases one finds symptoms of the two systems in the disequilibrium and the pharmacodynamic tests of Heile and Thoms in do not solve the problem. We will see later that we can draw similar conclusions from cases in which we have operated

#### THE MECHANISM OF GASTRIC CRISIS OF TABES

The gastric crisis of tabes is essentially an irritative syndrome of the afferent paths of the stomach either at the level of the spinal roots or at the level of the root of the vagus

It is still undecided whether the stomach or any other abdominal viscus possesses true sen sorv fibers. However, it is certain that the majority of the connectors of the gastric sensibility pass through the solar pletus the splanch incus major, the ganglionic and vertebral chain the white rum; and reach the cord through the dorsal roots from the sixth to the tenth or even the eleventh and twelfth.

At present there is no proof in favor of or against the existence of sensory fibers of pain in the trunk of the vagus The failure of Expers subdiaphragmatic vagotomy in the treatment of gastric crisis of tabes does not testify as Foerster says against the possible rôle of this nerve in the sensibility of the stomach We know indeed that in the gastric crisis of tabes the painful irri tation is not in the subdiaphragmatic segment of that nerve but in the root itself. The resection of the root alone (Toerster Luettner's operation) could make us decide on the role of the vagus in the sensibility of the stomach. Neither is it known whether the phrenic nerve contains any pain fibers from the stomach but clinically it seems to

The topographic mechanism of pain as a symptom is thus elucidated. To explain vomiting one may admit an excitation of the vagus reaching the bulb and referred toward the periphery by the thoracie roots (influencing the draphargm and the abdominal muscles) by the splanching increase (innerving the stomach) and by the vagus (innerving the cardin). However, we do not exclude strictly local reflexes at the level of the gastric mucous membrane itself, hypersecretion and vomiting going on even after suppression of all the afferent paths.

Gastric hyperkinesis evidently depends on stimulation of motor fibers at the level of the spiral roots as well as at that of the terminal ganglia Nusca is a vagal syndrome and is probably caused by the excitation of the cen-

trifugal root

Our knowledge of the metament levels corresponding, to different nerves affected in gastric criss is relatively precise. The afferent and the efferent there from the stomach seem to enter the cord through the roots from the lith to the twelfth dorsal. The fibers belonging to the phren ic nerve arise from the third fourth and fifth cervical segments. The topography of the arus is known.

Our knowledge of the segmental distribution of the cord dictates our surgical procedure

Foerster called attention to the important role of the posterior root in the mechanism of gastric crisis. Posterior radications of even a large number of roots has not been uniformly success

Therefore since 1911 Foerster has begun to resect the anterior roots. The role of the anterior roots in the conduction of sensibility has been sustained by Kidd (1911) Lehmun (10 0) Foerster (19 0) Lehman (1020) Head and Shaw (10 ) Foerster (19 4) Shaw (10 5) Critchlex and Wolfsohn (1020)

In extreme view is held by Lchman who believes that the anterior root alone conducts deep and visceral sensibility. This theory has been enthusastically discussed by Frobhich and Meyer Weizeacher Mueller Useer and others New research work on the subject has just been published by Meyer. His conclusions are very positive. The law of Bell holds true in mrin and il experimental work tend to prove that the sensibility goes exclusively through the posterior roots.

However Foerster expressed himself as follows. The anterior and posterior roots contain the afferent paths. The posterior roots constitute the principal sensory system, section of them con stantly results in the production of sensory disturbances provided a sufficient number of rosts has been sectioned. The anterior roots constitute in auxiliary pathway of sensibility their interruption alone never provokes any appreciable sensory disturbance. However the fibers of the anterior roots may in a certain measure cover the sensory deficit resulting from destruction of the posterior roots. This compensatory action applies chiefly to deep sensibility but also in a less degree to cutaneous sensibility. The experiments of Shwi confirm the veracity of Foerster's counting.

It seems however that the antenor and pos terior roots are not alone concerned in transmit ting visceral sensibility Foerster who has had great experience in operating on patients with tabes has come to the conclusion followin exam inations made on patients in whom the posterior and anterior roots and even the lateral spinothala nuc tract had been cut that there must also be an extraradicular route by which pain stimuli may reach the central nervous system explains this as follows One must think of the possibility of pain stimuli being conducted from the stomach by way of the periartenal sym pathetic plexus of the gastric vessels, the aortic plexus the sympathetic trunk and from there to the cord by the corresponding rami communi cantes (eighth cervical to third lumbar roots) is we have previously mentioned the question of whether or not the vagus carries painful impulse remains open

# THE RESULTS OF A VRIOUS SURGICAL INTERVENTIONS

The peripheral operations (extirpation of the solar ganglion by Leriche elongation by Jaboulav isolation by Delbet and Mocquot) only partially remove the afferent and the efferent pathways

Resection of the splanchnic nerves purposed by Jean and executed by Foerster and section of the rum cannot be depended on to effect a cure

Section of the posterior and anterior roots combined with cordotomy is certainly the operation of choice in chais with sympathetic predominance

As far as vagal cris s are concerned subdia phragmatic vagotomy is ineflective section of the roots of the vagus proposed by Foerster Kuettner has not been done sufficiently often to permit one to pass jud ment on its ments I one of our cases of the vagal type amelioration obtained by section of the thoracte roots has been so remarkable that for the time being we have decided to discard the vanous operations on the vagus nerve. We have so far not had the opportunity of operating in a case of crisis of phrenic type and do not know that this operation has been criried out elsewhere

After what we have said about the participation of the anterior roots the posterior ones and perhaps the ganglionar chain in the conduction of gastric pain it is obvious that both roots must be sectioned. This is accomplished by Foerster through the intradural route. We have tried to perform it by an extravertebral route which produces less trauma by combining section of the intercostal nerves with that of the ram communicantes in the paravertebral line.

#### THE TECHNIOUS OF NEUROR AMISECTOMY

This technique for neuroramisectomy was subgested by that of Gazi. The patient is placed horizontally in ventral position with a pillow under the inferior portion of the thorix. The dorsal spinous processes are carefully located If they cannot be palpated because of obesity one may readily orient himself by the stunted nodular structure of the transverse processes of the last dorsal vertebra which we have examined atrophy of the transverse process of the eleventh dorsal vertebra was well marked.

The operative field is disinfected. At about 3 centimeters outside the spinous processes one cuts successively the fascia of the latissimus dorst the inferior fibers of the trapezius the latissimus dorsi and the superior fibers of the small serratus posterior inferior. The muscles are then retracted and one may view the transverse processes to which the numerous small muscles of the back are attached These transverse processes are carefully cleaned with scissors and periosteal elevator The next step consists in severing these processes as near as possible to the vertebral laming and detaching them from their costal articulations This step may provoke a certain amount of bleeding which comes from the posterior branches of the intercostal artery order to check this it is advisable to place a swab in the space thus created while one severs the process situated above or below

The intercostal nerve is next located To do this one cuts the fascia of the external intercostal muscle and entiers the space situated between the internal and external intercostal muscles in which one finds mixed with fat and loose connective tissue the intercostal nerve with its vessels liberates it with a probe and holds it on a hook. The next step consists in isolating the raim. In order to do this, the intercostal nerve must be

slightly stretched one must stretch it only slightly in order to avoid injuring the cord

By cleaning the intercostal nerve carefully with a probe one discovers the rami and often the spinal ganglion with the outer portions of the spinal roots. It is advisable to touch with the probe only the tissues which one sees so as to avoid injuring small vains and arteries nearby. One next resects the rami and the adjoining portion of the intercostal nerve. A few interrupted sutures will serve to join the muscular tissues and the skin may be sutured as the surgeon practies.

#### ILLUSTRATIVE CASES

CASE 5 I man received the initial syphilitic infection in 19 5 In 1919 he expenenced uncertainty in walking and wiscal symptoms. These manifestations were progressive. In January 19 0 root pains of the shooting typ appeared but were interpreted viscatic pain. By 1922 the shooting pains had become marked in the lower extrem ties and were accomprised by a feeling of uncasiness in the epigas tum and a sen ation of swelling deep in the area of this stomach and it is left hypochondrium. In 19 3 tere were a I wery punful crites in the right hypochondrium and troublesome bluous vomiting.

Whene am ned in 1925 if e patient was 513 ears of age and in 1900 re leath. There was a general wheen e of tendon r fixes. Babinskis and Oppenheim's signs were present on the 18,4th the cremasteric and abdominal cutaneou r fieces. The absent Atana in the lower extremities we smarked. The patient frequently suffered from vertigo.

Ophthalme examination revealed pupils of medium collabor on the left the trgyll Robertson s gn was incomplete on the right it was complete Headache was common from a psychic standpoint the memory was failing and the e vas definite less of interest the patient was queru lous. The stomach was dilated and there was difficult of inderness in the epiga for region. Pain was present in the region of the gall bladder but the viscus was not pall pable.

The gastroradicular type of crisis predominated in the case. The crisis was extrumely se ere and i sted for suveral rivs during which the pat ent could not take any food houses and womiting were continuous and re ulted after painful efforts in the evacuation of bilous liquid. Between the enter a paperitie was absent and if the patient made in effort to eat pyro is and often commiting followed sometimes providing a fresh error is. Or certain days the pain was focal zed in the rich thypocol draim there was nausea without vomiting a ten lency to fainting spill and heimerana or bilatteral tempor I pain

B to cass stember 9 5 and January 1926 attempts were mad to r he v tie e cies by venou form of treatm at Salvasan stovar depunephin b muth milk intramuscularly and phalo tan combined with tuber cul n were trud with out succe s

At neurolo is vimination in November 1925, it became appar in that an area of hypesthe in from the tenth deal to the second lumbar cutaneous areas, with an area of typic the tena above it the if ror bor! rof which shifte! I om day to day. In the hyjesthetic vice even very strong elect it all stimula were without effect but a certal a sensition easies to at persisted. The rew agencial used diminuition of sen titven so of the nerve trunks and of the uscers on pressure. On the left there is accudence of a

bg: in Hors ynd m. phth tmo deniut fth plp blin ucad myd. Pill th. t low lemb was upp. dand m. l. diyp t tle t Syphit my cadt with ntlity ftl dp ioi f rytlm w hpt la fii

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In this case we had to deal with advanced tabes with thoracic radicular crisis gastrovesical crisis and sometimes vesical crisis of the varial type All medical measures failed to bring about The state of nutrition was extremely Bilateral paravertebral anæsthesia sus pended all the trouble immediately the first for 5 days the second time for 8 hours Section of the er hth minth and tenth dorsal roots on the left and the rams did not modify the root pain the sympathetic pain or the gastric crisis in the least Section of the seventh eighth minth and tenth dorsal nerves and rami on the n.ht caused an instantaneous disappearance of the pain which was continuous for more than 3 weeks

CASE 6 1 m n ag d 46 v rs was f st by u s Foru y 195 Th dat of the yphit of then unk w S 198 th patent halbent tof g tic toubl s (a d lysp p ia) lat r fo gat hep t ympt m and co t patio a d fin lly fo chol cr t: It teration the gall bladder ppear d normal Shortly
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Convalescence was uneventful and the patient was up on the fifth day

A year after the first operation the patient appeared to be in excellent health. There was slight hypotoma of the muscles of the abdomen in the right honochondrium with pilomotor arefleya and cutaneous an esthesia to pain and heat. There was a marginal area of hyperasthesia in th area innervated by the sixth dorsal

In this case we had to deal with gastrovesical and sometimes intestinal crises which dominated the clinical picture Section of the seventh eighth minth tenth and eleventh dorsal roots and rami on the right brought about immediate re hef for a months Because of the recurrence of the gastric crises we performed a similar operation on the fifth and sixth dorsal roots. The troubles disappeared entirely and the cure has persisted for more than a year

CASE 7 A woman aged 59 years was married but had never been pregnant. Her husband had died recently following g neral paralysis. The date of the patient's yphilitic infection, was unknown. The present illness began in 1020 with pain in the lumbar region which in creased in intensity and frequency until it wa typical of true severe crisis For more than 5 years these pains re si ted all kinds of therap utic measures and there was not a week in which they did not occur. At the onset of the attacks there were eructations gastric beaviness and nausea for several hours but no vomiting and no real However these premonitory symptoms gastric pain inspired terror because they were invariably followed by the true painful on is characterized by violent shooting pain in the back from the sixth to the tenth dorsal ver tehræ the pain radiating laterally to the avillary line and The pain was much never reaching the gastric region more marked on the left than on the right During the crisis which might last from several hours to several days the patient remained in bed and had absolutely no desire for food Since 1020 constinution I ad been marked The patient was emaciated and of a subicteric color

On examination the Argyll Pobert on sign was observed There was byperæsthe in in a region corre ponding to that in which there was subjective pain the patient was able to give tile limits of this area with surprising accuracy. The knee jerks were abolished the right ankle jerk was weak Romberg 1gn was absent and there was no appreciable ataxia

In order to determine the origin of the pain we injected a o 5 per cent solution of novocain into the paravertebral spaces in which the pain was maximal that is from the sixth to the tenth dorsal nerves on the left and from the seventi to the tenth dorsal on the right. The stomach was observed by means of the fluoroscope before and after the injection Before injection ptosis was marked the stomach was hypertonic emptied rapidly and a large air pocket was evid nt After injection gastric motility was dimini hed and the passage of food through the pylorus was slow

At operation November 26 the si th seventh eighth ninth and tenth dorsal roots and the rami on the left were severed The effects were striking and immediate Con valescence was uneventful and the patient was up 5 days

after operation

Six months after operation the violent pain on the left ide bad completely disappeared the pain on the right side had all o vanished except on two occasions on which there was only slight pain accompanied by the usual

gastric symptoms. There was a region of hyperæsthesia on the left side with slight prickling in the area innervated by the nerves severed at operation The pati at a appetite was good the tongue was clean and the pasty taste was gone from the mouth. The constipation had di appeared and the howels moved easily and regularly Since operation the patient had gained 16 pound and has been able to

In this case the predominance of root pain was marked visceral disturbances being only faint and introducing the crisis. Severing the sixth seventh eighth minth and tenth dorsal roots on the left (the most painful side) with the rami suppressed the pain on the left side entirely and on the right side almost entirely but it did not improve the slight gastric disturbance

#### CONCLUSIONS

Surgical measures in the treatment of gastric pain bave generally speaking dealt on the one hand with the organ itself and on the other with the paths through which the painful impulses were thought to be reflected in the respective metameres

These ideas may be applied to the gastric crises of tabes more than to any other pain Clinical analysis of this type of pain reveals a radicular factor superficial and deep sympa thalgic elements and possibly vagal or phrenic participation It is the uncertainty of these factors which may explain the failure to provide relief in all cases

Clinical or pharmacologic criteria which would enable one to estimate the part played by these various factors and thus to determine appropriate treatment apparently do not exist study leads us to make certain assumptions but efforts to determine the state of the neurovegetative equilibrium have not given us faithful results

From a practical point of view the majority of tabetic crises are vagosympathetic in type

From an anatomophysiological standpoint the tabetic crisis is an irritative syndrome of the gastric afferent paths either at the spinal roots or at the roots of the vagus The posterior spinal root plays the chief rôle but we cannot exclude the anterior root from participation in this proc ess through its sympathetic fibers. The part played by the sensory fibers in the vagus is still

A physiological operation for the relief of tabetic gastric crisis (since the participation of the vagus nerve is still unknown) should thus be directed toward the posterior sensory root and the sympathetic fibers of the anterior root the combined section of the two roots and the re section of the rami answers these requirements

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# IHI FELIER YOKE AS A PROPHYLACTIC MEASURE FOR POSTOPERATIVE PRESSURE PARALYSIS FOLLOWING FIRE USE OF THE FRENDELENBURG POSITION!

By I CRINT BILDWIN M.D. IN ARBOR Mr. 1

URING the list part of the inneteenth and the first of the twentieth century praises thought to result from unstitlettes and introduces yet dis used at some length by many writers both in this c untry and abroad vince 1908 he wever there is very httle wilable literature on this subject in t because this on litton has crused to exist but I eccuse the majority of writers have agreed by the as to the etology and the best prophylactic measures to prevent such surrend necelents

It is not the purpese of the article to contradict prayous claims or to present any new theories as to the etiology of these paralyses but merely to lescribe three cases resulting from pressure of shoulder supports while the patients were in the Trendelenburg position and to offer the Petter

voke as a prophylictic agent

Buedinger was one of the lirst to describe cases f paralysis of one or more extremities following operation. He reported 9 cases in 1894 followed in a short time by a more. In 1855 krumm retireved the subject and referred to articles by forty separate investigators. From then until 1008 many other reports may be found.

In discussing this condition the majority of writers agree that it is wordable and that the most important prophylactic measure is the correct position of the arms during the operation namely at the side or crossed upon the chest There were a few Green for instruce who regued that the paralysis was not due to pressure but to the direct toxic action of the anaxshesia He reports a case of complete prushjass of the right upper extremity following operation for cholethniass performed under chloroform and points out that the arms were folded upon the chest throughout the operation

The two types of paralysis which must be considered are the central and the peripheral. The former is guite rare and is due to an ischamus oftening, secondary to a harmorthage or to primary degeneration the result of a tour active of the anasthetic upon the crebral corted (Halstead). Hersman expresses the use of the majority however when he says. Paralyse following an anasthetic v hich are due to that agent alone are more imaging—

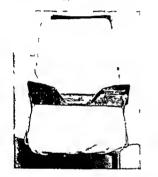
It is the other type the peripheral and e-pecially that of the brachial pleuus that comes within the scope of this article. Undoubtedly the josition of the arms is an all important matter as most of the reports strite that the arms were displaced upward and brickward over the head during the operation. With the arm in such a position the clavicle is drawn upward with a resulting compression of the cord of the brachial pleuis between the clavicle and the first fill. With marked abduction of the arm the clavicle rotates so that its posterior superior border becomes its posterior inferior border and the with the clavicle comes its posterior inferior border and in this was decreases the available space between the clavicle and the first rib.

Other conditions that predispose to a pot operative paralysis as pointed out by Leszynsky are extension of the head toward one side thus stretching the nerve trunks the position of the arm under the head or body during a lon operation the position of the arm or leg over the sharp ed e of the operating table thus causing pressure on one or more of the peripheral nerves pressure on the part of the anæsthetist with lingers or elbows upon the region of the brachial plexus and finally pressure from metal clamps or tight straps over the shoulders or lower extrem ities. Our cases all fall into the last group as in each case the arms were folded upon the chest and metal braces were used to support the shoulders

SHOURTER



ig i Operating table with whe attached she in thod used for adjusting position of yoke to fit hould r



lig. New of yoke from end of table showing metal rights in position

perating table by traction in the axille is reconsible for a small percentage of these palsies and should be discouraged

The point at which the brachal plexus is comressed varies as can be seen in the difference in the resulting paralyses. It may vary from the impression of a single cord to a compression of Il of the trunks of the plexus. The fifth and with cervical roots are more often involved as ney cross the first rib causing an Erb's type of also involving the deltoid clavicular portion of the pectoralis major brachalls anticus biceps apparator longus and not infrequently the suprapointus and infrespinatus muscles (Turney)



It 3 Patient upported by yoke Arms are fold be chest during the operation



1 ig. 4 Air v of patient in deep Trendelenburg position sho ving even di tribution of pressure upon the shoulder As n I igure 3 the arms should be folded upon the chest

The point at which pressure will cause this injuris located one inch above the clavicle at the posterior border of the sternocleidomastoid muscle. The seventh and eighth roots may be damaged in the same way or by being stretched over the head of the humerus.

CASE 1 Mrs L M G aged 45 married weight 135 pounds mother of 5 children ent red the hospital on No ember 2 1936 becau e of abdominal pain and menorrhag a F amination showed the fundus to I larger than no mal and revealed a mass in the right br a I lagament On November 20 1936 the patient was ope ated upon and a p nhysterectomy and bilateral salping cophorectomy were performed for a tub - orarian absces

the side or folded upon the chest. There should be no pressure in the pophted space when Inc patient is in the Trendelenburg position and when using deep Trendelenburg especially as deep as is necessary for gynecologic operations a suitable shoulder support should be used. By suitable is meant one that will not cause pressure upon one small area but which will evenly distribute the pressure across the shoulders.

It is believed that the Felter yoke fills these requirements very satisfactorily. It was designed by Miss Letter operating room nurse in Dr. W. Chipman's Clinic at the Loval Victoria Hospital in Montreal and acknowledgments are made to him for permission to describe the voke

in this article

The accompanying drawings and photographs are it is believed self explanatory (Figs 1-5) The yoke may be constructed of any kind of wood. The one made for this clinic is of birch carved to fit the shoulders heavily up holstered and encased in a rubber covering to prevent soakage from blood and vomitus. It can be made by any carpenter to fit practically any modern operating table. It is attached to the table by two metal uprights which are angled at 90 degrees and pass through metal cylinders one of which is permanently riveted to the table upon each side. A set screw is placed in each of these cylinders and by means of these the voke can be adjusted to fit any length patient. The space for the neck is cut in a gradual curve and measures 7 centimeters in its greatesi width The voke is 9 centimeters wide and 9 centimeters high This voke has been in use in this clinic since June 19 7 and has proved very satisfactory and as yet no postoperative pressure paralyses have developed

#### CONCLUSIONS

r Postoperative brachial paralysis is not common is usually temporary but may persist

for years or indefinitely

2 It is usually due to pressure and is avoidable by proper position of the arms proper position of the anaesthetist and by a well fitting shoulder support when the Trendelenburg position is used 3. The Tetter voke causing an even dis

3 The Letter voke causing an even dis tribution of pressure seems to be a most advantageous form of shoulder support and being of simple construction can be made by any hospital carpenter

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# A STUDY OF FIVE HUNDRED CASES

BY MELLONITHE CAMPBILL M.D. NEL YORK
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B M W H p I

7 AT ICOCELE is characterized by elonger tion dilatation and tortuosity of the veins of the pampiniform plexus the permatic not infrequently sharing the condition with the remasteric and deferential vessels. Symptoms if resent are predominantly those of sexual neuras thenia For this reas in surgical treatment is apt t be resorted to in place of common sen e lan c cele is observed chiefly in young adults and in most of these it disappears symptomatically at least by the time the patient is 35 years old In private practice particularly of prologists pa tients presenting symptoms sufficiently evere to varrant operation are rare perhaps one or two a year. On the other hand in large hospital, we have constantly before us those seekin this opera tion a large number of a hom to so to fulfill cer tain physical requirements for national defense rganizations (Army Navy and Marine Corps) r local municipal lepartments (Fire Police etc.) Of the soo cases of varicocele here reported from the Urological Service of Bellevue Hospital one tourth fall in this category. The large number of the e asymptomatic ca e subjected to seemin ly needless surgery stimulated our study and obervations on all phases of varicocele among these 300 cases are here presented

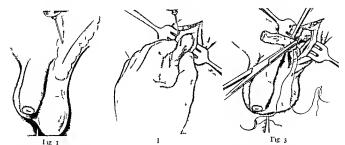
Two types of varicocele are recognized (a) contaneous idiopathic or primary and (b) sec ndary Secondary varicocele results from sper matic vein obstruction by intra abdominal tu nors most often of the kidney but occasionally large carcinomata of the pelvirectal region rarely retroneritoneal tertoma or sarcoma Such varico celes appear suddenly on either side grow rapidly to great size cause little di comfort and are usually presented by elderly patients bearing a palpable abdominal mass Pepper (16) cites a a e in which the sudden appearance of a varicocele heralde l a spindle cell renal sarcoma 6 months before this tumor was recognized clinically White (22) saw an acute left varicocele of 6 veeks duration disappear immediately upon re moval of a py mephrotic left kidney I specially s the sudden appearance of right sided varicocele sug e tive of abdominal tumor Varicocele of obstructive origin 1 readily diagnosed when the patient is placed in the prone position when we note that the veins do not readily empty them

selves as in the primary type. Removal of the obstructing tumor mass constitutes the treatment Spontaneous varicocele is the type commonly seen Usually the etiology is obscure or unknown Undemable age is a factor for while we had . cases 12 years old and 1 case so years old over oo per cent of our patients (Table 1) were between the ages of 15 and 35 the period of greatest sexual potentiality Nearly all were unmarried and had poortunities for sexual relief inadequate to their desires which erves to perpetuate a constant genital congestion Abuse by sexual exce ses or masturbation may also result in this condition By analogy some gynecologists believe that such continuous congestion is a definite factor in the production of varicocele of the ovarian pampini form plexus (usually left!) which not infrequently is accompanied by symptoms similar to those attributed to varicocele Although most your adult males are subjected to sexual influences con ducive to chronic pelvie con estion but i in 10 develops varicoccle Billroth (3) believed the to le dependent on a peculiar diathesis first effectin the vessel of the pampiniform plexus later those of the leg and rectum Prima (17) has recently suggested that varicocele is merely one manifesta tion of a generalized substan lard condition Such hypotheses do not explain unilateral involvement -over go per cent are left sided. In this series we on the right side alone to were found but

bilateral I or years this left sided preponderance has been explained on the well known anatomical basis viz (a) the left testicle hangs lower than the ri ht (b) the left spermatic vein is longer and (c) empties into the left renal vein at right angles and posses es either no valve or at least valves which are mefficient to support the spermatic column of On the right side the vein 1 sh htly shorter empties directly into the vena cava at an acute angle and there po sesses efficient valve Intomical mensuration re eals the left sper matic vein to be normally but 15 to 5 centi meters longer than the right hence it seem more reasonable to believe that the physico anatomical factors if any are solely those of efficient valve function on the right side Vascular dy function is more common in old men in whom varicocele i rarely encountered but leg varicosities and hamor

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I is a Infiltration and site of the inci i n f rilectomy. The incisi n is made high in this turn and stend somewhat above the level of the site nal in uin l

Il 2 After the funcular sleath 1th its remaster covering has been exp sed the c rd which is still n its bed 1s well infiltrated. Injection made high t th

rhoids are frequent. Chronic constitution with an overloaded sigmoid obstructing the spermatic vessels has also been advanced as a cause but this condition also is characteristically a disease of advancing years. Therefore while the actual cause is unknown it is certain that chronic passive genital congestion is a most important if not the underlying factor as is demonstrated by the rapid disapperrance of most variococles with the assumption of the normal sex relation ship of marriage. In other words marriage symptomatically curies most variococles to material of the control of the normal sex relation ship of marriage. In other words marriage symptomatically curies most variococles.

#### PATHOLOGA

Venous tortuosity and dilatation form the pathological picture in the early stages Later fatty atrophy endophlebitis and not infrequently Connective tissue phlebolith formation ensue hyperplasia between the distended vessels accompanies the congestion Moderate varicosities do not involve the testicular blood supply but with more extensive vascular changes the testicle cir culation may be impaired and atrophy of this organ result (7 times in this series) changes are those of fatty degeneration followed by atrophic sclerosis It has been stated that with dilatation of the veins about the nerves there is an associated periphlebitis and neuritis accounting for both testicular pain and atrophy Anatomically three venous groups are recognized in the spermatic cord the anterior having in its midst the spermatic artery is the first to be

I r in uina canal vill give a mo t sati facto y l lock and the ia

I is 3 Excision of the varicoccle Attention is direct of to th translation ligature on the proximal venous stum; The di tal ligature end are left long so as to be utilized as ndicated in Figure 4. The vas with its artery and one or tv ins is undit utiled.

affected and constitutes the main body of the varicocele mass the middle or those surrounding the vas deferens and the posterior passing upward from the tail of the epiddymis. Occasionally in old men varicocele of the posterior group involving particularly the tail of the epiddymis results in sclerosis of the lower pole of the testicle. We have not recognized such a case.

#### SYMPTOMS

Acute varicocele may follow violent strain and is usually accompanied by severe local pains. We have seen it three times

Otherwise the onset is gradual many patients bearing varicocele are totally free of symptoms even though the lesion be of considerable size Too frequently the symptoms are those of sexual neurasthenia viz marked depression nervous ness headache lack of concentration impotence vasomotor disturbances characterized by pallor cold moist hands or occasional flushes and lastly but perhaps most important an irrepressible anxiety complex or fear of either a defective gen ital apparatus or the loss of sexual function These and a variety of generalized aches and pains out of all proportion to the objective find ings are common Such patients usually display marked modesty on examination and complain of tenderness of the testicle and cord on manipula tion

Of uncomfortable stimuli produced by varico cele the most frequent is a dragging sensation in

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the te tick oft n referred t the cord groin l y er lett ab lominal qua frant left lumbar regii n eligastrium or alon the haft f the penis Al w ra le achin testicle pain may le constant some times aggravate l by standin walkin or work ing Tyo four nationts (one a skating instructor') had to give up their customars employment because of extreme pain. In two thers the mun vas referred to the epigastrium froducin repeated attack of nausea mone Curiou ly 1212 tients allege I their symptoms to be aggravated I a warm yeather-a vas dilutation Leing probably the explanation Scrotal burning after defactti n in one case and burnin, in the testicle in tw in tanc are haracteristically the symptoms of neurotics One hundred twenty eight sought operation to fulfill certain physical requirements fir civil service army etc Iractically all of whom ere asympt matic many ignorant of the le ion until appruse l of its presence by the e imining ith er

# | 1 NB | F | II -- DUP \ TION OF VARICOCELE (\) | NOITO | IN | P\TIFNT) | ( | U | 3 | 1 | 39 | | 1 | m | 1 | 41 | | 2 | m | 1 | 42 | | 3 | 5 | 5 | 5 | | 4 | 5 | 5 | | 5 | 7 | 7 | | 6 | 7 | | 7 | 7 | | 8 | 7 | | 9 | 8 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9 | | 1 | 9

vitil Objectively one notes a relaxed scrotum all w hanging left to ticle with the outline of the for tuous veins often vi ible against the scrotal wall Lalpation discloses the typical bag of worms feeling which can be confused with no other lesion excert rarely omental hernia. At times small phicholiths are encountered. The te ticle acasionally shows atrophy noted by some with incidence as high as 11 per cent (17) in our series a trifle over a per cent (Table II) Scrotal varues are also found sometimes focu in, attention to the accompanying varicocale by their pre ence or by rupturing as in one case of ours Varices of the wall may also induce annoying scrotal itchin A thickene I emilidamis is a common finding and whether it i associated with the chronic conge tion or results from infection is not known.

#### D1 \GY0515

Omental herma is perhaps the only condution apt to be could set with varicoccle and we may rule the nut by having the patient he down and noting the emptying of the scrotal veins. A hin er is place I over the external in untal rin and when the patient rises the omental herma will be held back while the year again fill. Many sarroccles are associated with inguinal herma (a) time in this series) but the presence of the latter should not make diagnosis difficult. Hydroceled considerable size may obscure the varicoccle

Most men lose their variococles after maria e I arely does the lesion persist althouth sometimes progressive enlargement continues terminating or thus matrix play of the tellule

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14

appear after a period of years and that most of the men complaining of varicoceles are neurotics

and are not relieved by operation

We recently confirmed Bloodgood's observa tions in a study of a group of 150 men under 30 years of age and another group of 150 over 50 years of age We found that of the first group of had moderate sized varicoceles in 4 of whom the lesion produced symptoms. Of the group over so years 4 had anatomical varicocele none com plained of symptoms and 6 gave a history of having suffered with varicoccle in early life but stated that the condition had since disappeared None of these 6 had been operated upon

Bloodgood and later Douglas (8) pointed out the s vere complications which may result from varicocelectomy-hemorrhage infection epidi dymitis hydrocele and most particularly loss of a functioning testicle by atrophy-all presumably to no benefit In a careful follow up in 106 of 10, cases operated on for Army enlistment Douglas found but 48 per cent normal after a postoperative intermission of many months 30 per cent had hydrocele and 4 had atrophy With this cheerless anticipation one considers surgical treatment

Therapeutically as well as clinically three types of varicocele are recognized The first type asymptomatic varicocele whether large or small is best left alone since operation frequently in duces numerous subjective symptoms leading ultimately to a definite neurosis Most of these patients are unaware of the lesion until it is demonstrated by an examining physician Most of the 128 cases operated on at Bellevue for enlistment or civil service fell in this class these patients are operated on against one's better judgment The second type denotes its presence by scrotal enlargement and a feeling of weight or a dragging sensation either in the scrotum (testi cle) or referred to the cord groin loin etc These cases are uniformly benefited by operation and constitute the type in which operation is definitely indicated The majority of varicoceles fall in the third group—those which are small vet which may be the determining cause of a sex psychosis progressively undermining both mental and physical stamina. These patients are a serious problem their symptoms and reactions are characteristically alike. Anxiety regarding the integ rity of their sex apparatus is their first concern Not infrequently they plead for an operation but in the same breath refuse to give their consent for fear of surgical injury to the testicle. They are entitled to not a little patience on our part and an explanation of the origin and mechanism of vari

cocele with the assurance that the condition is not

TABLE III - ASSOCIATED SURGICAL CONDITIONS C dt Herma Puht Lett Bilateral Scrotal varices Hydrocele I eft Right Stricture urethra Spermatocele left Movable ri ht testicle

Circumcision a serious one and that after marriage it will prob ably disappear Patients who are refused or who refuse operation easily fall prey to the charlatar or unscrupulous practitioner who encourages the patient's notion that varicocele will cause lost manhood

At Bellevue Hospital we operate perforce on many of these varicocele neurotics. They will not help themselves and if not operated upon allow

themselves to progress to an ill fate

We do not operate on asymptomatic patients however unless they have been sent in by sur geons of the various municipal departments par ticularly the fire and police departments. A short time ago we addressed a letter of inquiry to the chief surgeons of these departments to ascertain the rationale of operation in these asymptomatic cases No reply has been received to date. To a similar inquiry Surgeon General E R Stitt US N answered It has been our experience in the Navy that it is not the large varicoccles that cause symptoms but rather the small ones and they are usually associated with neurasthenia or hypochondria Such patients repeatedly apply for treatment until the condition constitutes a dis * * It has been my ability for efficient service custom as Surgeon General when candidates for the Academy have been rejected because of vari cocele causing symptoms to advise against opera tion and in most cases this defect is wrived unles it is associated with certain other disqualifying de It is of course realized in the case of enlisted men that it may be a convenient excuse Lieutenant Colonel J F Siler for malingering of the Surgeon General's Office War D partment Varicocele is not a bar to enlistment or replied commission unless it be large or prinful enclosed tabulation indicated that in the Army 8 736 days of hospitalization were caused by vari cocele from 1922 to 19 6 inclusive further evi dence that the condition merits serious considera

Operation is indicated then in cases of large varicocele causing symptoms-particularly tho e

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TABLE IV -- SYMPTOMS (SUBJECTIVE)
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  O st d g
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 Pf gp
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   L mb
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          m
     (w th
  L w lt q d
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          i, aft
               d f
 tlth
Rnt dct1
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of weight or drag—in which atrophy of the testicle is feared. Operation is indicated in the third group—the small varicocle with symptoms out of all proportion to the objective findings—only if correction of sexual hygiene is hopeless psycho therapy has failed or the wearing, of a suitable scrotal suspensory has given no relief. In the German Army (23) operation is performed only when a suspensory fail to relieve. Sanford (10) cites as other indications for operation absence or disease of the opposite testicle complicating her man or hydrocele of the same side a history of recurring phlebitis thrombosis spontaneous rup ture or calcareous condition of the years.

Sympt m

#### OPERATION

In most cases local amesthesia is the anest hetic of choice. An excessively neuropic patient may demand general anesthesia as occurred 6 times in our series. In some of our earlier cases complicated by hermotomy general anesthesia was given but we now do these under regional block.

While I have had no experience with the procedure others have found that resection of the scrotum for varicoccle neither cures nor releves since the remaining sac containing the heavy venous mass soon attains its former size

Subcutaneous h ation devised by the elder keyes (14) relieves varicocele detains the patient in bed but a day or so but does not relieve pain Moreover it is a blind procedure not without danger of trauma and hamorrhage and it present is rarely employed

For novelties in varicocele operations one must look to the European surgeons The underlying TABLE V --- PHASICAL EXAMINATION C dt
T tele
Wt phy
Sl ht
M d t
M k d
Tolks g l
Tolks g l
Top g of t d

principle in most of these procedures is ample sus pension of the testicle thus relieving the vas of the weight-the cause of most of the pain more nar ticularly cord pain. This suspension is brought about by various methods as for instance transverse suture of a longitudinal incision of the cremasteric fascia (10) or deviation of the course of the spermatic cord by (a) (14) creating a new and higher internal inguinal ring or (b) suspend ing the cord through a fascial flap in the external oblique -all without excision of spermatic ves sels (21) Fiorini combined excision of the sper matic veins with eversion of the tunica va malis and suspension of the testicle to the pillars of the external ring Amorosi (1) and Jacob (13) also described orchidopexy the operation of the latter differing in minor details from that devised by Vincent at about the same time (1918) on the Urological Service at Bellevue Hospital This remains to the pre ent our standard pro edure for varicocelectomy Vincent's operation is recorded only by keyes (14) The followin is a description of the method

After novocain infiltration (Fig 1) a low hernia incision exposes the external ring and the emerg ing spermatic cord Turther cord infiltration i usually advisable at this point (I'i vessels are exposed by a longitudinal incision through the cremaster and the funicular sheath The anterior vessel are separated from the defer ential group as high as the external rin and do in to a point which when raised to the level of the external ring will elevate the testicle about 2 centimeters higher than it normally han's These mobilized anterior veins-constituting the main body of the varicocele-are divided between clamps (Fig 3) and each is tied securely with a transfixion ligature at least r centimeter from the cut end so that the ligature will not slip off The ligature of the proximal stump is cut short and this part is dropped back into the inguinal canal where it retracts from sight On the other hand the ligature on the distal stump is left at least 6 inches long The intercolumnar fascia is now di vided and with a knife handle or grooved director a path is burrowed underneath the external oblique to a point opposite the internal inguinal ring The long ends of the ligature each threaded on a blunt or aneurism needle are introduced into the inguinal canal under guidance of the director or knife handle and at a point opposite the internal ring are separately pushed through the aponeuro sis of the external oblique. They are then tied over the few intervening strands of aponeurosis (Fig 4) The tying of this lighture pulls the distal stump up into the inguinal canal thus elevating the testicle about 3 centimeters higher than its usual level and relieving the vas of all tension The wound is closed without drainage

We then apply the Bellevue scrotal suspensory (5 6) This dressing affords both testicle splinting and suspension until the upper portion of the elevated venous stump becomes partially fibrosed to its new inguinal position. Unless this support is applied there is likely to be slipping of the suspended organ even though chromic suspension sutures are employed This method was followed 308 times in this series. In the remainder, the generally used end to end tying of stump ligatures after venous excision was performed. Five days in bed postoperatively usually suffices the average period of hospitalization in uncomplicated cases was 64 days

We are careful in performing varicocelectomy to keep away from the tunica vaginalis unless it is to be opened for hydrocele as trauma will increase the probability of subsequent hydrocele. In elevating the testicle if one carelessly pulls too hard the tunica vaginalis will not infrequently be found presenting in the wound an excellent position for traumatization

#### COMPLICATIONS

Hydrocele is the most common complication of varicocelectomy and as already indicated follows injury to the tunica vaginalis. The specific gravity of such hydrocele fluid proves that it is not a transudate resulting from vascular disturbances as alleged by some Transudates are characterized by a low specific gravity 1 002 to 1 006 hydrocele fluid registers 1 020 to 1 026 or that of an inflam matory evudate-in these cases of traumatic origin Hydrocele as a sequela of operation for varicocele was found in 39 per cent by Douglas (8) 30 per cent by Bloodgood (4) and 23 per cent by Corner (7) We have been able to follow per sonally but 42 patients in this series Of these 4 developed by drocele were moderate sized (esti mated at 5 ounces) the others were small (15 cubic centimeters) I erhaps our small number of hydroceles following varicocele operations is explained by the care employed to operate in the

#### TABLE VI -SURGICAL TREATMENT

	C
Anæstbesia	
General	1
Local	479
Type of operation	
End to end	102
Suspension and excision	398
Scrotal r section	2
Additional operations	
Hydrocele	5
Herma	46
Spermatocele	I
Complications	
Infection	
Supe ficial	55
Deep	34
Hæmatoma	7
Epididy mitis	
Acute	1
Subacute	4
Cut vas	1
Venous thrombosis	1
Slipped ligature with severe retroperatoneal hæme	r
rhage	I

inguinal region and to avoid trauma of the tunica vaginalis

Atrophy of the testicle is with one exception the most serious complication. In the 42 cases followed r a medical student showed marked atrophy 2 showed moderate atrophy Bloodgood in studying hermiotomy with resection of the veins found atrophy in 15 per cent of 6r cases without resection in a case in roo. Corner found the testicle smaller after operation in 21 per cent

Hæmorrhage may be the most serious complica tion as in one of our cases A boy o years old complaining of scrotal enlargement and testicular pain for 10 years was operated on by a member of the house staff who performed the routine varico celectomy with suspension of the testicle Tifteen minutes after returning to bed the patient found his scrotal dressing soaked with blood. He was returned immediately to the operating room and given a general anæsthetic. The wound was reopened and it was seen that the bleeding came through the external ring but the source was not disclosed until the lateral abdominal wall was widely opened and the peritoneum pushed back This revealed the freely bleeding and greatly retracted proximal venous stump from which the ligature had slipped After a ligature had been properly applied and a large amount of blood had been evacuated the wound was closed with drain The patient promptly developed a deep infection which for some time was most threaten ing but eventually healing was completed. Free and speedy retroperatoneal exposure is required in such cases Fagge (9) reports a similar instance in which slower bleeding produced a flank mass with

#### TABLE AIR - FOLION & P CLIMC

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Go d ult
R c e ce
O c s | D

fever It was diagno ed as a hypernephroma but exploration enabled ex usation of over 60 ounces of retroperitoneal blood clot with ultimate healing Localized hematomata from yound bleeding are usually not alarming although we saw one which exten led suprapubically for 3 inches down thore the pense enlarging line organ to three its normal size and into the ser turn where its size leman le lexituality. Set fall resection for super tical varies in a litting it variocolectomy with suspension in two cases was fillowed by serotal hematomy one case requiring, exacution of the clots—serotal resection is rarely if ever in detailed.

Infection often follows blee lin., Deep infection usually associated with hematoma followed oper attoin in 34 of our cases. One wisely avoid han dling the skin in performing vari ocelectomy as it is practically impossible to sterilize the skin of the scrotum and lower group.

Postoperative induration is frequently noted but nice attention to harmostasis will ob late most of this "shillen" (o) devised an operation said to eliminate induration—a complete resection of the anterior veins from the internal in_uinal ring to the testicle without disturbing the vas in its bed

Acute upth is mits followed operation m₃ a days in 1 crose subacute path/imits developed in 4 others. Once the unidentified vas was accidentally cut but it was immediately sutured. Venous thrombosis vas noted once. In a case of Keyes (15) several surgeons failed to make the diagnosis of pampiniform piecus thrombosis because never having felt such a thing before they were usuall ing to permit their indigers to make the dagnosis. Pemoval of the clotted vens was followed by good result.

Testicular pain was complained of by 3 of the 42 collow up cases in one a suspensory brought relief in another the discomfort van noted in hot weather only. Of patients followed by Barney (2) 36 per cent stull had pain 27 per cent had a sex neurosis and 15 per cent suffered a recurrence. In our series re operation was performed in 9 cases originally operated on elsewhere. We are not aware of recurrence but if we were able to follow more of our patients probably many more complications and undesirable sequelæ could be recorded flowever this operative procedure as used at

Bellevue has proved far superior to other methods more commonly employed and because it does unformly relieve testicular pain and dra which are the chief symptoms of varioccele we believe it to be the technique of choice

#### SIMMARY

The etiolo v of varicocele is not clear but in most cases varicocele is associated with chronic genital congestion induced by faulty sexual by giene Of the soo cases here reported a of every to were between 15 and 35 years of a e Advancin years or marriage symptomatically cure most varieoeeles. The right side is but rarely involved If the lesion is large and of long standing testicu lar atrophy is frequently observed. The ba of worms feeling elicited on palpation of the pampi niform plexus establishes the diagnosi Clinically and therapeutically three types of varicocele are recognized (1) asymptomatic varicocele of which the patient is unaware. The e are best left alone (2) Vioderate or large sized varicocele. Its pres ence is denoted anatomically by scrotal enlarge ment and symptomatically by a feelin of wei ht pain or a dragging ensition either in the testicle or referred to the cord groin or loin Operation (3) Small varicocele which benefits these case causes symptoms disproportionate to the objective findings. Most varicoceles are of the third type The patients are broadly grouped as sexual neurasthenics They are best treated by the institution of common sense sexual and physical lugiene A scrotal suspensory will relieve many In this type of patient operation i usually un satisfactors as the symptoms persist after oper ition

The suspension operation devised by Vincent on the Urolo ical Service at Bellevue Hospital is the procedure of choice because it uniformly relieves pain and testicle drag and postoperative sequelæ are minimal Hydrocele and atrophy of the tes tiele are the most frequent postoperative compli cations Hemorrhage from the spermatic vessel may be most serious. It should be remembered that the tunica vaginalis may be injured without presenting itself in the operative field and care to operate high on the cord with a minimum of manipulation will do much to diminish the incl dence of posts aricocelectomy by drocele Atrophy follow operation in a moderate number of cales I mployment of transfixion suture about the re seeted spermatic cord vessels will eliminate severe hemorrhage \fter operation testicular support is very essential for at least to days. The pa tient is usually confined to bed only for from 5 to 7 days

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TABLE VII - FOLLOW UP CLINE c h/H At phy Go d

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fever. It was diagnosed as a hypernephroma but exploration enabled evacuation of over 60 ounces of retroperatoneal blood clot with ultimate heal ing Localized hæmatomata from wound bleedin are usually not alarming although we saw one which extended suprapubically for a inches down along the nears enlarging this organ to thrice its normal size and into the scrotum where its size demanded exacuation. Scrotal resection for superficial varices in ad lition to varicocelectomy with suspension in two cases was f llowed by scrotal hæmatoma one case requiring evacuation of Scrotal resection is rarely if ever in dicated

Infection often follows blee ling Deep infection usually associated vith hematoma followed oper ation in 14 of our cases. One wisely avoid han dling the skin in performing varicocelectomy as it is practically impossible to sterilize the skin of the scrotum and lov er groin

Postoperative induration is frequently noted but nice attention to hæmostasis will obviate most of this Skillern ( o) I vise I an operation said to eliminate induration-a compl te resection of the anterior veins from the internal inguinal ring to the testicle without disturbing the vas in its bed

Acute epidi lymitis followed operation in a days in I case sul acute epididymitis developed in 4 others Once the unidentified vas was accidentally cut but it was immediately sutured Venous thrombosis vas noted once. In a case of keyes (15) several surge ins failed to make the diagnosis of pampinif rm plevu thrombosis because never having felt such a thing before they were unwill ing t permit their fin ers to make the dia nosis Remo al of the clotted veins was followed by good result

Testicular rain was complained of by of the 42 follow up cases fn one a suspensory brought relief in an ther the discomfort was noted in hot weather only Of patients followed by Barney ( ) 30 per cent still had pain 27 per cent had a sex neur sis and 15 per cent suffered a recurrence. In ur s ries re operation was performed in 9 cases ori inally perated on elsewhere. We are not a are 1 recurrence but if we were able to follow m re f ur patients probably many more compli cation and undesirable sequela could be recorded Ho e er this operative procedure as used at Bellevue has proved far superior to other methods more commonly employed and because it does uniformly relieve testicular pain and dra which are the chief symptoms of varicocele, we believe it to be the technique of choice

#### SUMMARY

The etiology of varicocele is not clear but in most cases varicocele is associated with chronic genital concession induced by faulty sexual hy giene Of the 500 cases here reported a of every ro were between 15 and 35 years of a e Advancin vears or marriage symptomatically cure most varicoceles The right side is but rarely involved If the lesion is large and of long standin testicu lar atrophy is frequently observed. The ba of worms feeling elicited on palpation of the pampi niform plexus establi hes the diagnosis Clinically and therapeutically three types of varicocele are recognized (1) asymptomatic varicocele of which the patient is unaware. These are best left alone (2) Moderate or large sized varicocele Its pres ence is denoted anatomically by scrotal enlarge ment and symptomatically by a feeling of weight pain or a dragging sensation either in the testide or referred to the cord groin or loin Operation benefits these cases (3) Small varicocele which causes symptoms disproportionate to the object tive anding Most varicoceles are of the third type The patients are broadly grouped as sexual neurasthenics They are best treated by the institution of common sense sexual and physical hygiene A scrotal suspensory will relieve many In this type of patient operation is usually un satisfactory as the symptoms persist after oper atton

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#### **EDITORIALS**

#### SURGERY, GYNECOLOGY AND OBSTETRICS

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# THE CANCER CELL IN GENERAL PRACTICE

THE most outstanding conclusion at the last International Conference for the Control of Cancer was that cancer must be recognized in its earlie t stages if it is to he cured by present methods. The chief function of the American Society for the Control of Cancer and an important activity of the American College of Surgeons is the education of the public and the profession in the early recognition of cancer.

The gradual average reduction each year in the size of neoplasms as they are seen in some of the larger clinics proves that popular and professional cancer campaigns are yielding the desired results. Coincidental with such reduction in size has come the increasing difficulty of differential diagnosis. Statistics show that clinicians are making a smaller percentage of positive clinical diagnoses of malignancy. These two facts the reduction in the size of neopla ms and the increasing difficulty of diagnosis dimand professional attention and will probably be met by exploration and biops. examination of tissue by excision if not incision of the tumor for clinical diag

nostic purposes This procedure will not be useful unless pathologists recognize the value and the proper method of making fresh tissue examinations Tissues must be fresh and un fixed they may be frozen and sectioned with a microtome or sectioned with a razor the latter giving thicker and not as satisfactory preparations Frozen sections should be stained with Unnas or Terry's polychrome methylene blue by immersion in the stain Pazor sections should be painted only on one side Sections made by the latter method rapidly fade but are satisfactory if a micro tome is not available. The technical method however is not the important part of making a diagnosis it is merely a means of saving time Knowledge of detail of the morpholomy of normal regenerative and neoplastic cells as seen with an oil immersion lens and wide experience in checking pathological against clinical data are the essential qualifications of a properly trained expert diagnostician of tis Fixed and embedded tissues will not serve in the cytological study of fresh tissue Mahanant cells have definite morpholo-ical and volumetric characteristics which distin guish them from adult and regenerating cells These characteristics can be seen only in the fresh unfixed condition with an oil lens The old histological criterion the penetration of the basement membrane does not represent the earliest stage of malignancy although it might be the arbitrary criterion for naming a lesion cancer malignant cells actually exist before the invasion of tissues and although they may not be called cancerous they are indistinguishable morphologically from cells which all pathologists call cancerous

cells are seen in the tubules and frequently outside the tubules in the breast in borders of chronic gastric ulcers and in the uterus. In the absence of any specific scrological test or skin reaction for cancer the presence of these cells is the best means of making early diagnosis. Their presence as an index for radical or extensive removal of an organ or the tissue containing them is more conservative and more definite than the past clinical criterion.

If therefore patients are to be urged to take early heed of all lesions and to submit to exploration and biopsy we must be prepared to recognize these early changes in cytology. Pathologists must become familiar with fresh tissues and be prepared to render immediate service to surgeons so that the patient may have the benefit during the operation of early biopsy reports. It is only in this manner that the medical profession can properly react to the publics response to cancer propaganda centered around early diagnosis.

WILLIAM CARPENTER MACCARTY

#### A CLINICAL APPRAISAL OF CHOLECYSTOGRAPHY

distinct contribution to medicine for which the profession is greatly in debted to Graham and his co workers. It is undoubtedly the best existing single labora tory test and promises to be as extensively utilized in the diagnosis of cholecystic dise ise as roentgenoscopy in diseases of the upper digestive tract. The method more over has been an indispensable procedure in present day research directed to the function of the gall bladder particularly to the mechanism of its emptying concerning which there has been much disagreement. Both climician and surgeon have welcomed its

advent as they appreciate the superiority of visualizing methods of diagnosis How ever, there are certain definite limitations to the method of which both physician and surgeon should be cognizant Previous re ports without exception have been misleading in that diagnostic efficiency has been esti mated largely on the basis of a group of cases in which the gall bladder was removed be cause of a diagnosis of cholecystic disease from the cholecystogram Diagnostic accu racy as high as 98 per cent has been claimed The actual diagnostic value of the method can be determined only by a consideration of its limitations and possibilities for error at the same time Before discussing these limitations it seems reasonable to assume that further progress is possible in this field only after the adoption of a common stand ard of what constitutes adequate gross and microscopic evidence of cholecystic disease It also seems reasonable to maint un that meticulous examination of a gall bladder may disclose departures from the normal resulting at times from a former transient and resolved inflammatory process which may have left the viscus able to function normally and not give rise to untoward symptoms Pathological criteria c in be mide so conveniently elastic that any slight de parture from the normal could be made the excuse for removing the gall bladder when the operation was undertaken on the basis of a mistaken cholecystographic diagnosis

Certain facts become readily apparent to those who bave had wide experience with cholecystography. First cases that afforded definite clinical evidence of cholecystic disease chiefly of calculous cholecystitis hy drops empyema acute subacute and gan grenous cholecystitis and obstruction of the cystic duct also invariably afforded positive evidence of disease in the cholecystogram.

Second the clinical history and physical examination after exclusion of the stomach and duodenum as the site of disease in many instances enabled the clinician to make a diagnosis of definite cholecystic disease verified at operation in a little more than oo per cent In this group cholecystographic examination would have been superfluous except for scientific reasons Finally the high degree of cholecystographic accuracy in cases verified surgically was probably more apparent than real Such cases were really sifted out by the clinician. In other words with the exception of a small group of clinically indefinite cases or those in which symptoms were mild with evidence of cal culi in the cholicystogram clinical criteria rather than cholecystography furnished the basi for diagno is and operation

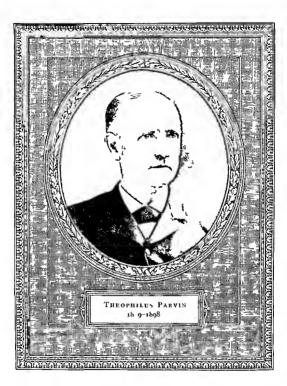
The limitations of the method are brought about by various factors such as variation in the reponse to the test in normal and pathological cases on repeated examination various sources of error both in technique and interpretation and frequent positive cholecystographic evidence of disease in which there is absence or insufficient clinical evidence of it. Positive errors are especially seen in two clinical types of cases the as thenic visceroptotic nervous patient with gastric subacidity or anacidity often asso ciated with a lowered basal metabolic rate and the patient with hyperacidity from what ever cruse and especially one with duodenal ulcer. On the basis of a large series at per cent of the proved positive errors occurred in patients with duodenal ulcer in whom the gall bladder va found objectively normal at operation. What is more important, there is i considerable number of cases in which holecystographic data are negative and in which definite symptoms and signs of chole v tic di ea e are verified at operation in

false negatives range as high as 25 to 30 per cent. This important feature has not been sufficiently stressed in the literature The silhouette of the thickened diseased gall bladder itself may simulate the appear ance of the dye filled viscus thus misleading the inexpenenced clinician and surgeon In a sense this is a negative error. A false negative response is highly possible in a gall bladder containing pure cholesterin or cho lesterin rich stones which are often found in normal appearing thin walled gall bladders therefore causing little change in the con centrating activity of the organ Such stones comprise almost 20 per cent of the total and negative responses are often seen althou h the history may be typical of hepatic colic

It is reasonable to infer that the intravenous mode of administration of the dye is the more reliable Whether it is sufficiently superior to replace the oral method which is far more convenient to administer and less un comfortable to the patient has not as yet been determined Both methods have their enthusiastic proponents Undoubtedly under certain circumstances especially in cases with anacidity and hyperacidity a repetition of the test by the intravenous method in doubtful cases is indicated. Ordinarily a repetition of the oral method should suffice Champions of the intravenous method should remember however that the negative cholecystographic response is the least reliable of all signs and the silhouette is inten ified hy this method

Cholecystography is essentially a test of function and not of disease a fact recently conceded by Graham The identification of the stones as shown by negative shadows is the cluef exception. At the present stage of development cholecystography should not be relied on to the exclusion of other data to a firm or reject the presence of a diseased gall bladder George B EUSTLEMMAN





## MASTER SURGEONS OF AMERICA

#### THLOPHII US PARVIN

THEOPHILUS PARVIA probably the most classical philosophical contributor to the literature of obstetrics and gynecology. America has ever known was born in March 1829 at Buenos Aires Argentina where his father the Rev Theophilus Parvin was stationed as a missionary. His mother was the daughter of Cresar Augustus Rodney attorney general of the United States under President Jefferson. She died when he was two weeks old and his father brought the child back to this country. The father died however when young Theophilus was 7

Parvin entered LaFayette College at 12 and finished his academy career in the University of Indiana in 1647. He studied Greek and Hebrew at Princeton received his master's degree in 1850 at the age of 21 and the degree of doctor of medicine from the University of Pennsylvania in 1852. For 2 years he shipped as surgeon on a line of packets between Philadelphia and Liverpool. He filled successively the chairs of materia medica at Ohio Medical College 1854 to 1864 of obstetries and diseases of women in the University of I ouisville where he remained until 1869 of obstetries and diseases of women at Jefferson Medical College Philadelphia from 1883 until his death in 1898. Dr. Parvin showed his versatihty in accepting the post of house surgeon of Wills Eye and Ear Hospital in Philadelphia immediately upon his graduation.

His writings attracted attention and he was besieged with offers of editorship of medical journals. In conjunction with Roberts Bartholow, who was with him on the faculty of Ohio Medical College at Cincinnati, Parvin edited the Cincinnati Journal of Medicine which is now in charge of Dr. Charles L. Bomfield. In 1868-7 and in 1868-9 he edited the Western Journal of Medicine, with David landell of the University of Louisville, he was conditioned that American I rac littoner 1869-1883.

In going through the bibliography of the latter third of the 19th century one is struck with the myriad of his contributions and the great variety of subjects upon which Parvin wrote always with a style most entertaining and illuminating. His textbook The Science and Art of Obstetrics which ran rapidly through several editions was marked by its accuracy and erudition and as well by the abundance of classical and modern references with which it abounded

He translated von Winckel's Diseases of Il omen from the German was a contributor to Ashhurst's Euccelopadia of Surgery Sajous Universal Vedical Sciences the Imerican Textbook of Obstetries and the Imerican Textbook of Therabeutics

He was successively elected president of the State Medical Society of Indiana the American Medical Association and the American Academy of Medicine he was one of the founders and an early president of the American Medical Editors as occution and he was a founder and president of the American Gyneco logical Society the Philadelphia Obstetrical Society and various other medical organizations.

In 189 he pre 11 I at the International Congress of Obstetrics in Brussels In 1890. I first met him while he was chairman of the obstetrical section of the tenth International Medical Congress at Berlin, where he was associated with Koch Esmarch. I lastair and Pasteur on a most notable series of programs. A long list of honorary fellowships in foreign societies is attached to his name. The preserved contribution to the their current medical literature comprises over one hundred and filty titles but these do not include all his writings. He must be classed as one of the great men who have illumined the medical profession with their intellectual attainments. His vigorous well chosen English was a delight. He can allusions were always upt. In fact he was the embo himent of the erudition which pervaded all his writings through the thirty years (1685 1868) of his active professional and teaching curreer.

Dr William H. Parrish who wrote his obituary for the American Medical Association said. Theophilus Parvin's career as the master obstetricing of America is familiar to the medical profession. During the last quarter of the 19th century he ranked undoubtedly among the greatest living authorities in medicine.

Hi textbook on obst trics was received enthusiastically by students and physicians alike and occupied the relative position in obstetrics that Samuel D Gross monumental work did in surgery that bir Thomas Watson and Trousseau did in medicine and Roberts Bartholow's Maleria Medica did in therapeutics

In 1889 Dr Parvin established the first obstetrical clinic in America following the method of von Winckel in Munich 34 cases were delivered without a maternal death. In making a report of this enterprise before the New York Academy of Medicine Parvin appealed to that organization to set the light to guide the profe sion making clinical obstetrics a part of the curriculum of the medical school of the country. He urged that every college which refused to take this step should be criticized by common condign condemnation.

Three philosophical essays of Parvin have come down to us in which a third of a century ago he analyzed problems which are today of peculiar interest

These were on 'The Genius of Medicine" "The Woman and her Physiciun, 'and 'The Casuistry of Medicine" The first was based on Conte s definition of a science as 'Knowledge which enables us to foresee and foretell events 'He said in substance. Let any case of common disease be examined by half a dozen educated physicians and there would be in almost every instance an exact agreement as to the nature of malady its progress and the means advisable to eliminate it or to shorten its course. The natural history of disease is so like an open book to the trained physician that he can in the majority of cases foresee and foretell it

Parvin said that the student must not forget that the foundations of our science were laid by Hippocrates the noble Greek and that it came not from the temple nor the 53 massium but from the laboratory of the physician

In his oration on Woman Parvin says Beauty is the common physical characteristic of woman age disease poverty suffering ignorance the play of evil passions may mar or destroy the beauty not in a single individual only but in those deriving their origin from her Nevertheless this gracious gift is the general possession of the sex

To show the remarkable impression Dr Parvin made on his auditors by the flight of his poetic tribute to the power of the beauty in woman, I will quote the following incident. I was astomshed while speaking of his life be fore the Louisville Obstetrical Society in Lebruary 1927 to hear Dr William B Doherty now 85 years of age who was on the Paculty as an instructor when Parvin taught in the University of Louisville repeat from memory the quotation from the twenty fourth ode of Anacreon the Greek poet wherein he spoke of the gifts of nature to all that breathe the air of heaven some boon wreathed horns to the bull, the hoof of strength to the steed speed to the timid hare. Then this apostrophe to woman

To man she gave in that proud hour
The boon of intellectual power
Then what O woman' what for thee
Was left in Nature's Treasury?
She gave thee beauty—mighter far
Than all the pomp and power of war
Nor steel nor fire itself hath power
Like woman in her conquering hour
So be but fur mankind adores thee
Smile and a world is weal before theel

The motive of Parvin in this address on woman was to emphasize the peculiar type of relation between the sexes and the delicacy needed in the practice of gynecology and obstetrics as contrasted with other departments of medicine

His greatest effort was in the essay The Casustry of Medicine in which he showed the problem which dominated all philosophy all science and its applica

tion to art not only in the ordinary relations of life but to us specifically through the evolution in medicine from that of Asculapius and Hippocrates down to our own myriad of specialties—the problem of right and wrong in a debatable decision. Of course, Parvin used the definition of casinstry as in its original application by the Jesuits in solving the questions of conscience the interpretation of chical principles to questions of conscience and judgment. He discussed many questions which today are still matters of controvers, birth control the induction of abortion where he quotes. Let let dura sed lever the right of the mother against the child if either is to be sacrificed, the question of which phase of prevariation constitutes lving in medicine which I re ident l'archild of Oberlin College decided in hi day and Joseph Collins in ours has clucidated. Many other points will appeal to every surgeon interested in medical history because as I ar in said casuistry is just as much to be applied to reasoning judgment and philosophy today vs. it was in the beginning of history.

Dr. Parvin is survived by a son Dr. Noble Parvin and a daughter Mrs. James P. Baker both living in Indianapolis. To them as well as to the successors in the chair he graced in the various medical schools. I am indebted for much of the personal data of this tribute to one of my ideals—Theophilus Parvin.

GEORGE CLARK MOSHER



#### LA GRANDE

# CHIRVRGIE DE M GVI DE CHAVLIAC, MEDE-

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### THE SURGEON'S LIBRARY

#### OLD MASTLRPIECES IN SURGERY

BY ALFRED BROWN MD FACS OMARIA

THE GREAT SUPGERY OF GUY DE CHAULIAC NUY DE CHAULIAC came into a world which T was actively undergoing a period of recon struction in all its intellectual and economic phases The crusades were only thirty years past at the supposed time of his birth (1300) and the les sons which they taught were heing absorbed and were causing a readjustment in the mental concept of the relation of the individual to life and its re sponsibilities The dark pall cast by blind faith in the dictates of medieval mystical monasticism was being rent asunder and the light of reason and learn ing gained from the pagan Saracen was peeping through to give the European a sight of the ad vantages of study and education on the one hand and of international trade through amicable commercial relations on the other This change had been going on gradually during the centuries of the crusades but it was not until the actual fighting ceased that the change in the psychological reactions of the people was fully appreciated Neverthele's the armamentarium so to speak which future genera tions were to use to their great advantage had been prepared The Universities at Salerno I adua Bologna Paris Montpellier and Oxford had been founded and the learning of the Ancient Greeks and the Arabian School was there to be taken advantage of by him who wished. In addition to these general world conditions Guy d Chauliac had the op portunity of carrying on the work of two great surgeons of his own country Jean Litard (died circa Henri de Mondeville (died circa 1320) who had been the famous professor of surgery at Montpelher

Guy de Chaulac was born in the little hamlet of Chaulac about 1300. He received his first instruction in medi ine at Toulouse and them traveled around Europe to the vanous medical centers to in crease his knowledge and experience. His wanderings carried him to Montpelher Bologna and Paris and possibly to Prague and at the end of this prod having be come grounded in medicine he considered himself equipped to take up the study and practice of surgery. In this he followed the dictates of his predecessor. Henn de Mondeville and expressed his behief when he discusses the qualifications of the surgeon and lud down as one of these qualifications. It is thus requisite in the first place that the surge on be learned not only in the prin

ciples of surgery hut also in those of medicine both in the theory and in the practice. He also stress d the necessity for a knowledge of anatomy and was for his time, an excellent anatomist.

Cuy s principal work was his Great Surgery so called because he is supposed to have written i authorship of the latter and it has been attributed to another author The Great Surgery was written when he was over sixty years of age and with th desire to pass his knowledge of the Surgery of the ancients and the results of his own experience on to others He was then physician and canon to Pope Urhan V as he had been to his predecessors Clement VI and Innocent VI He says he is writing the work also Partly for myself as a soluce in my old age and to exercise my mind and to you Messieurs the phy icians of Montpellier Bologna Paris and Avignon principally those of the Popes who have been my companions in the service of the Roman Pontiffs with whom I have been sustained in guard ing against mediocrity by listening reading and operating I will state with a moderate abbreviation the principal things that the sages and wise men have spoken or written in many volumes of books on surgery Wherefore this book will be called the inventory or collection of Surgery

Guy succeeded so well in his task that his work became the standard reference work and textbook in surgery for centuries and he was called the father of modern surgery. His knowledge of his subject was marvelous and his ability to express this knowledge in clear and lucid style was unsurpassed though in actual contents the book is just what he tried to make it a review of the best there was in surg ry Passed on in manuscript form for over a century it was first printed in 1478 and from then on until the seventeenth century.

In 1879 Laurant Jouhert Chancellor of the University of Montpellier published the best French edition of Guys surgery up to that time Joubert consulted all the printed editions and many of the manuscripts and after many years study produced the volume the title page of which is shown. It was printed at Lyon by Michel Estienne at the Stephanus Press following the then beginning ou tom of printing medical books in the vernacular Jouhert however edited a Latin edition which was printed at Leyden six years liter.

#### TA GRANDE

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# THE SURGEON'S LIBRARY

# OLD MASTLRPIECES IN SURGERY

BY ALFRED BROWN MD FACS OWARD

THE GREAT SURGERY OF GUY DE CHAULIAC VUY DI CHAULIAC came into a world which T was actively undergoing a period of recon struction in all its intellectual and economic phases. The crusades were only thirty years past at the supposed time of his birth (1300) and the les sons which they taught were being absorbed and were causing a readjustment in the mental concept of the r lation of the individual to life and its rc sponsibilities The dark pall cast by blind faith in the dictates of medieval mystical monasticism was being rent asunder and the light of reason and learn ing gained from the pagan Saracen was peeping through to give the European a sight of the advantages of study and education on the one hand and of international trade through amicable commercial relations on the other. This change had been going on gradually during the centuries of the crusades but it was not until the actual fighting ceased that the change in the psychological reactions of the people was fully appreciated Nevertheless the armamentarium so to speak which future genera tions were to use to their great advantage had been prepared The Universities at Salerno I adua Bologna Paris Montpellier and Oxford had been founded and the learning of the Ancient Creeks and the Arabian School was there to be taken advantage of by him who wished In addition to these general world condition Guy de Chauliac had the op portunity of carrying on the work of two great surgeons of his own country Jean Pitard toted circa 1328) who had founded the College de St Come and Henri de Mondeville (died circa 1320) who had been the famous professor of surgery at Montpelher

Guy de Chaulac was born in the little hamlet of Chaulac about 1500. He received his first instruction in medicine at Toulouse and their traveled around Europe to the vanous medical centers to in crease his knowledge and experience. His wanderings carried him to Montpellier Bologna and Paris and possibly to Prague and at the end of this period having become grounded in medicine he considered himself equipped to take up the study and practice of surgery. In this he followed the dictates of his predecessor Henrick Mondevill and expressed his belief when he discusses the qualifications of the surgeon and laid down as one of these qualifications. It is thus requisite in the first place that the surgeon be learned not only in the prin

ciples of surgery but also in those of medicine both in the theory and in the practice. He also stress d the necessity for a knowledge of anatomy and was for his time, an excellent anatomist.

Cur's principal work was his Creat Surgery so called because he is supposed to have written a Little Surgery but doubt bas been cast upon his authorship of the latter and it has been attributed to another author The Great Surgery was written when he was over sixty years of age and with th desire to pass his knowledge of the Surgery of the ancients and the results of his own experience on to others He was then physician and canon to lope Urhan V as he had been to his predecessors Clement VI and Innocent VI He says he is writing the work also Partly for myself as a soluce in my old age and to evercise my mind and to you Messicurs the physicians of Montpellier Bologna Paris and Avignon principally those of the Popes who have been my companions in the service of the Roman I ontiffs with whom I have been sustained in guard ing against mediocrity by listening reading and operating I will state with a moderate abbreviation the principal things that the sames and wise men have spoken or written in many volumes of books on surgery Wherefore this hook will be called the inventory or collection of Surgery

Guy succeeded so well in his task that his workhecame the standard reference work and textbook in surgery for centures and he was called the father of modern surgery. His knowledge of his subject was marvelous and ha ability to express this knowled e in clear and lucid style was unsurpassed though in actual contents the book. Is just what he tried to make it a review of the best there was in surgery. Passed on in manuscript form for over a century it was first printed in 1478 and from then on until the seventeenth century.

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at Leyden six years later

#### REVIEWS OF NEW BOOKS IN SURGEKY

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and R S D ismort of Cleveland contribute th Surgery of the Thyroid Clan 1 This exc ed agivalue ble is ction is most lucidly written. The very omplete chapter on the Surgery of the Neck is written by George II Semken of the N w York Skin and Cancer Hospital

Volume III The first section by Nathan ef Alli son professor of orthopedic sure ry at Harvard Medical School forms a concise and autho itative textbook of orthopedic surgery E L Eliason prof ssor of clini al surgery University of Pennsylvan a Med cal School has contributed the sections on d s locations and I actures William O Neill Sh rman chi f surgeon of the Carnegie Steel Company is th author of the chapter on the Operative Treatment of I ractures The very excellent a ction on the surgery of the hand is by Hugh tuchineless pro fessor of chaical su gers. College of Physicians and Surgeons Columbia University This writer makes full acknowl dements to the pione r work of han a el The illustrations of this section are remarkably The section on amputations by Phil p D Welson instructor in orthopedic surgery Harvard Medical School is the best monograph on this sub Ket heh the revie r has seen Dallas B Phem it r professor of surgery University of Chicag has ritten a vers excellent chapter on I y ogenic O teo my let's The concluding chapters of this volume ar on Varicose V ins Varicose Ulcer Thrombo t hiebitis and Postphiebitie Induration of the Lower Extremities by John Homans instructor in surgery Ha vard Medical School Thrombo ingitis Ob lit rans by Leo Buerger (author of Circul t r) Disturbances of the Extremities ) and Cond tions Derendent upon \asomotor Changes in Blood \es s I by R n Ler che the mi ent professor of surgery Un v rs ty of Strasbourg

Volume IV The volume has been a nt out b force complet on The chapters on the Surgery of the Thora by I of sor t corge J Heur of the University of C cinnati C Il ge of Medic ne and on the S reers of the Br ast b 1 rofesso Hugh Suchin clos of the Coll g of I h sic ans an I Surgeons Columb a University h ve not been printed but will b for ar led by the put le hers for ins rtion in this vol me l'mmet Ri ford p f ssor of surg ry Stan ford Um crstty Medical S hool ha contribut d a chupter on th Surgery of the Lymph tie S st m In the 4 p ges de otel to The Surge v of the E ophagus by Fran Torek of the Lenox Hill Hospit I New 10 L this subject is most able and completely handled Elhott C Cutler professor of su g rv Western Reserve Un versity and Claud S Beck instructor a surgery Western Res rve Uni re sity have contribute I the s tion in the Sur gery of the Heart and I er cardium The s ction on he min is ritten by I rof ssor Seward Erdman of Columb a th Coll ge of Physicians and Surgeo

University and th New York Hospital

Volumes V and VI. The high standard set by the first four volumes of Nelson s Loose Leaf Surgery is maintained in Volumes V and VI which have just been issued. Volume V which is devoted to abdom inal surgery is incomplete the papers of Profissor Alessandri of Rome on the Surgery of the I wer and of Professor Ochsner of I rulane on Surgery of the Intestines are absent but may readily be inserted in the loose left binder when supplied

The very valuable chapter on Peritonitis is by

Joseph A Blake

A J Walton of London England has contributed 120 pages on the Surgery of the Stomach and Duodenum

Vernon C David has furnished the Surgers of the Rectum and Anus with the exception of Malignant Disease of the Rectum which is by

Daniel I Jones

The chapter on Appendicitis is by Reger T Vaughan and Eugene H Pool and Ralph Stillman are the authors of the excellent section on the

Surgery of the Spleen

The Surgery of the Fancreas 1 by John Spiese The Editor in Chief Professor Allen O Whit ple has chosen for his subject the Surgery of the Bihari System and has made it a most complete and valu

able chapter

Volume VI is devoted entirely to the subject of urology and many of the country, a most enument urologists have combined to make it an extremely valuable text of that subject. The surgery of the urethra and pems and of the serotium testicles and groin are by Franklin P. Johnson and Francis R. Hagner respectively.

Hugh H Young has contributed the chapter on the Surgery of the Prostate which includes a size tion on Suprapubic Prostatectomy by Alexander Randall William C Quinby has written the Surgery of the Seminal Vesicles and William R Fronty that of the Bladder with the exception of Congenital Anomalies Tumors and Diverticulum which i by J A C Cotston

The chapter on Renal Structure and function is by Frank Hinman and that on Aephrolithiasis

by H A Towler

The volume is concluded by chapters on Tuber culosis and New Growths of the Kidney by David M Davis on Cystoscopy and Urethroscopy by A R Stevens and on Laboratory Urology and

Experimental Work by Edwin Davis

The mechanical details of the loose leaf feature already familiar to many through Nelson's Loose Leaf Medicine are excellent. The binding covers are strong and rigid yet readily permit opening and reading of the volumes. The extra pages may be quickly and securely placed in the binder. Genunc Morocco binding enhances the appearance. The price charged subscribers for the renewal pages in cludes membership in Nelson's Research Service Burnau which will supply when requested without further charge special information upon any sur gical subject.

The reviewer considers the six volumes of Nelson's Loose Last Surgery here reviewed to be an extremely valuable addition to the surgeon's reference library. The contributors are authoritative and the articles useful written. The editors and publishers may be congratulated upon accomplishing so successfully that aims namely the presentation of a Surgery of Today.

SIR WARING'S Manual is a written in the usual form of single volume books on operative surgery an introductory chapter on surgical technique is followed by chapters on regional surgery—surgery of the stometh and intestines repair of hernia surgery of the biliary system spleen and pancreas urologic and gy necologic surgery etc. There are also chapters on otolary ngology and on ophthalmic operations. The volume is arranged in a systematic manner and is compact. While the various subjects are incessarily only briefly covered the work is encyclopadic in its scope and is a valuable desk reference worl for practitioners as well as students.

J R BUCHBINDER

M LIGNANT disease the curse of the human race is ever confronting the medical profession The general practitioner in some remote part of the world is no less interested than the cancer specialist in the large medical center. Whatever information that is of practical value which is and can be assem bled in usable form is of value to humanity only so far as it can be put into the hands of the physician who must treat the afflicted ones Such a publication of value is Sir Waring s Surgical Treatment of Walig nant Disease? The author's original idea of the treatment of malignant disease was briefly expressed in his Bradshaw lecture in 19 1 This led to an analysis of the cases treated at St. Bartholomen s hospital and the collection of a large amount of data from the clinics the world over In the Oxford mone graph the author presents an a sembly of these facts in a classified description of malignant discase from a clinical and surgical aspect, the pathological view being considered only insofar as it has a bearing on diagnosis and treatment. Every phase of malignant disease of the body is covered in some instances in an excellent manner in others in a less graphic and questionable way The discussion on malignant dis case of the tongue mouth pharenx and larynx is unusually complete. The use of barrum sulphate in the bladder as a contrast media for \ Ray study of carcinoma must be seriously questioned e pecially since sodium todide or bromide has yielded such positive results in the \ Ray studie of the unnary tract A careful reading of the chapters on malignant diserse of the bones will show that the author con siders sarcoma a disease which offers a poor prog nosis yet a less careful study by one not familiar

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vith the subject might onvey the opposite impres n as the author frequently refers to exceptional cures. More information on the diagnosis of bone s coma would be of distinct value

Man chapters can be praised and not a few criticated for lack of specific detail and possible difference for on vet here is a book of some 700 pages de voted to the common subject of malignant d sease for climical veryonit. A large number of statistics are included. It offers the reader in a coneise first of the fir

rk W thal it i an assembly of a large amount of aluab! formation t mpered by the knowledge of a su g on f unusual experi nee J A Worr R

THE one rative surgeon s gi ng more and m r co siderat o to ancesthes a its choice indi dual pplic t n and effect. As a result we find r ord of far fe v r postoperativ complications not t m nt a lo r mortality rate The selection of an anasth s hould b depe dent upon the type of pats ta dhis ability to bear a contemplated oper t on The a lable t chnical abil ty and facilities shull also be considered. The sele tion of the should hy no means he hased upon the d gg d det rm ation of the surgeon to choose either a loc lorg al angesthes a as a routine The advo eat of lo al anæsthesia must r member that in not fe s c ses a Il administered n trous oxide gas th r or thylene a æsthesia may he best for his patt t vh le the average surg on who uses only g eral asth six could proftably employ local with sia in an increasingly large number of se

lect d eases No doubt one of the potent factors hi h caus s this lack of kno ledge as to the alue of lo al anxishesia is the result of the complex and bos methods in hich local anxishesia is pre

bos methods in hich local anæsthesia is pre s ted to the surg cal profession and of the lack of s) stematic teaching of the subject to the under graduate student

I his ecent monograph de Takats endeavors to co er in a r ther hrief and didactic manner the g ner is op of loc langesthes a as he is teaching the subject to the undergraduate and postgraduate med a lastudent He states in the preface. The student

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should feel that local anaesthetic methods are a put of his surgical training and that he can acquire does without the difficulty of working himself into a topplected new field—a new specialty. This social specialty it is an improvement of surgical technique which is open and accessible to every prospective and active surgion and which will bring gratifying results in h is morthally and mortality statistics.

The author makes no claim to originality but presents to the reader in a coness manner the funda mental principles upon which the technique is dependent. Many illustrations clarify and amplify the text. It is pleasing to note that specific contraindications to local anæsthesia are frequently mentunged.

The revener is personally acquainted with the author's scheme of teaching the subject as well as with it will be author's scheme of teaching the subject as well as with the usual technique employed in many types diadvadual application. There can be no question but that the portray all in this small text is accurate and well within the scope of the average graduate or even under graduate student a comprehension. The surgeon will find it a hirel and astisfactory text that will hing to his attention the essential and salient points of local anaesthesis.

THEN WRIGHTS little hook on appendicting the antition for the lay public is really remarkable in that it presents a very complicated subject in such a clear and forceful manner. It contains a concise review of the anatomy without making the subject burde some It analyzes the ethology and symptoms in such a way that the reader doe not get the impression of the present that the reader does not get the interest of the disease. It especially emphase is es the fact that d seemfort and occasional pain in the right lower quadrant are not necessarily caused by the appendix.

In his outline of treatment it seems to me that Dr Wright has emphysized the most important de tails the dangers of eatharties tle dangers of delay state what sail happen in the course of the disease lie especially emphysizes the fact that the pat does not de as a result of the operation but in spite

On the whole I consider this book a very fine presentation of the subject of appendictits it may be read with henefit by the medical profess on and will be of great value to the lay public

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# CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

CHORGE D STEWART New York President

I PANKLIN H MARTIN Chicago Director General

#### BOSTON COMMITTEE ON ARRANGEMENTS

#### TREDIRIC I COTTON Chairman

#### JOHN D ADAMS NATHANIEL ALLISON Franklin G Balch ALEXANDER S BFGG I Eunos Brices DAVIO CREEVER ARTHUR L CHUTF I H CUNNINCHAM HARVFY CUSHI G LINCOLN DAVIS

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WILLIAM C QUINBY CHARLES L SCUDDER JOSEPH L STANTO I A WARREN STEARNS JAMES S STONE LORING T SWAIM HAROLD WALLER WYMAN WHITTEMORE HANS ZINSSFR

# COMPLETE PROGRAM FOR THE 1928 CLINICAL CONGRESS IN BOSTON

THE surgeons of Boston have prepared and will present a highly attractive program of clinics and demonstrations in the hospitals and medical schools of that city during the eighteenth annual Clinical Congress of the American College of Surgeons beginning Monday October 8th and continuing through Friday October 12th The clinical program will completely represent the clinical activities of that great medical center in all departments of surgery A schedule of clinics and demonstrations prepared by the Committee on Arrangements under the leadership of Dr Frederic I Cotton Chairman will be found in the following pages The real clinical program of the Congress will be issued daily in the form of bulletins that will be posted at headquarters each afternoon giving a complete and accurate schedule of the clinics and demonstrations that are to be given at each of the hospitals on the following Printed programs will be distributed each dav morning

I or those whose practice is confined to ophthal mology and otolaryngology the Committee has prepared in addition to clinics and demonstra tions during the morning hours of each day a series of clinical demonstrations and conferences on Fuesday Thursday and Friday afternoons to be presented in the Georgian Room at the Statler Hotel The program for these sessions will be found in the following pages On Wednes

day afternoon in the same room a symposium dealing with the principles involved in the standardization of eye ear nose and throat departments in general hospitals will be presented

General headquarters for the Clinical Congress will be established at the Statler Hotel where the ballroom foyer and other large rooms on the mezzanine floor have been reserved and will be used for registration and ticket bureaus bulletin boards technical exhibition executive offices etc. Headquarters will be open for registration at 8 o clock on Monday morning October 8th The ballroom at the Copley Plaza Hotel will be utilized for evening meetings hospital confer ences the annual meeting and other large gatherings

A special feature of this year's meeting will be the showing of several surgical films that have been produced under the supervision of and approved by the American College of Surgeons A number of such films will be given their premier showing at Boston In addition it is planned to show a number of surgical nlms that have been made in England and France

A feature of the Boston meeting that will be of interest to all surgeons will be the celebration of Ether Day at the Massachusetts General Hospital on Friday Exercises will be held at rr o clock in the dome room of the old building of the hospital where other was first administered

for the production of surgical anaesthesia on October 16 1846 On this occasion a bronze bust of William T G Morton will be presented to the hospital

In addition to those surgeons from abroad whose names appear in the program for the eve ning meetings there will be present at this year s Congress a number of distinguished surgeons from various parts of the world including. Sir George A Syme of Malvern Australia President of the Australysian College of Surgeons George L Waugh Thomas P Dunhill and Percy T Hughes of London In land I de Martel of Laris France Charles G | Morice of Welling ton New Zealand Farguhar Macrae of Glas.ow Scotland Daniel J Cranwell of Buenos Aires Argentina Louis L Cas idv and Charles J MacAuley of Dublin Ireland Ulises Valdes and Rafael Reygades of Mexico City Mexico

#### INENING MITTINGS

The general program a prepared by the execu tive committee includes evening sessions on each of the five days f the ( n res The complete program for these evening sessions vill be found in the following pages | The I residential Meeling on Monday evening in I the Con ocation on Fri day evening are to be held in Symphony Hall On Tuesday Wedne lay and Thursday evenings meetings will be held in the ballroom of the Copley Plaza Hetel At the I residential Meeting on Mon lay evening the President Llect Dr Franklin H Martin of Chicago will be inaugur ated and vill give the annual address. On the same evening the Murphy Oration in Surgery will be delivered by Irofessor Vittorio Iuth professor of orthopedic surgery in the university at Bologna Italy and Director of the Rizzoli Institute At the Convocation on Friday evening the Fellowship Address will be delivered by Dr William T Mayo

On Wednesday evening the visiting surgeons vill be guests of the Boston Surgical Society at a special session at 1 high the Henry I Bigelow Medal is to be presented to Professor Chevalier

Jackson of Philadelphia

#### OPEN FORUM AND SIMPOSIUM ON TRAUMITIC SURGERY

An open forum on traumatic surgery has been planned for Friday morning at the Copley Plaza Hotel beginning at 10 o clock and in the after noon at o clock a more formal presentation of the subject at which time papers will be presented without open discussion. For the morning session a number of subjects have been selected and men chosen to give five minute talks thereon folloning which there will be a general discussion The program for the open forum is as follows

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The following program for the symposium in the afternoon has been prepared

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In connection with the meetings on Inday dealing with various aspects of traumatic surgery it is important to note that a series of clinics in industrial surgery has been prepared for each afternoon to be held in the medical department of the American Mutual Liability Insurance

#### Company A detailed schedule of these clinics will be found in the preliminary clinical pro ram ANNUAL MEETING

The annual meeting of the Fellows of the College will be held at 2 o clock on Thursday afternoon in the ballroom of the Copley Plaza Hotel reports of officers and standing committees will be presented and officers elected for the ensu ing year

Following the annual meeting there will be presented a ymposium on the Treatment of Malignant Diseases with Radium and \ray which will include a special report on the treat ment of cancer of the breast. The complete program for this session appears on another page

#### HOSPITAL CONFERENCE

The eleventh annual hospital conference of the American College of Surgeons opens on Monday morning at 10 o clock with a session in the ball room of the Copley Plaza Hotel. The program for the bospital conference which ealls for morning and afternoon sessions in the same room on the following days and which is published complete in the following pages provides an interesting series of papers practical demonstrations and round table conferences dealing with numerous problems related to hospital efficiency.

A special session on Wednesday afternoon will be of particular interest to those whose practice is confined to surgery of the eye ear nos, and throat. The papers that afternoon comprise a symposium dealing with the principles involved in the standardization of such special depart.

ments in general hospitals

During the Chincal Congress there will be a meeting of hospital record librarians to be hild at the Copley Plaza Hotel. An interesting and instructive program of practical papers and demonstrations has been prepared dealing with a number of the problems associated with the maintenance of case records in the hospitals. A model record room will be on exhibition

The hospital conference program is planned to interest not only surgeons but also hospital trustees executives and personnel generally and an invitation is extended to all persons who are interested in bospital activities to attend

#### SPECIAL TRAIN FROM CHICAGO

For the convenience of Pellows living in the central and western states who will attend the Boston meeting arrangements have been made with the New York Central Lines to provide a special train leaving Chicago at 9 A w on Sun day October 7th arriving in Boston at 9 a M on Monday The special train will be equipped with all steel cars of latest design including club compartment observation sleeping and dining cars No extra fare will be charged. The train will arrive at Cleveland at 5 28 P M making con nections there with regular trains over the Big Four from Indianapolis and Cincinnati arrangement is contingent upon reservations for such a special train being made by the minimum number required by the Interstate Commerce Commission rules Tellows are urged to make their re-ervations for the special train at the carliest possible date making application at the office of the assistant general passenger agent of the New York Central I mes LaSalle Street Station Chicago

#### RI DUCED R VILWAL FARES

The railways of the United States and Canada have authorized reduced fives on account of the Boston session of the Chinical Congress so that the total fare for the round trip will be one and one half the ordinary first class one way fare. To take advantage of the reduced rates it is necessary to pay the full one way fare to Boston procuring from the tecket agent when purchasing ticket a

convention certificate which certificate is to be deposited at headquarters for the vise of a special agent of the railways. Upon presentation of a visced certificate to the ticket agent in Boston not later than October 16th a ticket for the return journey by the same route as traveled to Boston may be purchased at one half the regular one way fare

In the eastern central and southern states and castern provinces of Canada tickets may be pur chised between October 4th and roth in south western and western states between October 3d and 9th and in the far western states and western provinces of Canada between September 30th and October 6th. The return journey from Boston must be begun not later than October 16th.

The reduction in fares does not apply to Pull man fares nor to excess fares charged for passage on certain trains Local railroad ticket agents will supply defuled information with regard to rates routes etc. Stop overs on both the joing and return journeys may be had within certain limits.

Full fare must be paid from starting point to Boston and it is essential that a convention certificate be obtained from the agent from whom the ticket is purchased. These certificates are to be signed by the general manager of the Clinical Congress and visced by a special railroad agent in Boston during the meeting. No reduction in railroad fares can be secured except in compliance with the regulations outlined and within the dates specified. It is important to note that the return trip must be made by the same route as that used to Boston and that the certificate must be presented during the meeting and return ticket purchased and used not liter than October 16th

An exception to the above arrangement is to be noted in the case of persons traveling from points in the Pacific Coast states and British Columbia who will be able to purchase round trup summer excursion teckets which will be on sale up to and including September 30th with a final return limit of October 31st. The summer excursion fare is somewhat lower than the convention fare men tioned above but is available only in the Pacific Coast states and British Columbia. Trickets sold

at summer excursion rates permit traveling to Boston via one direct route and returning via an other direct route with liberal stop over privileges

#### LIMITED ATTENDANCE-ADLANCE REGISTRATION

Attendance at the Boston sesson will be limited to a number that can be comfortably accommo dated at the climics the limit of attendance being based upon the result of a survey of the amphit theaters operating rooms and laboratories in the hospitals and medical schools as to their capacity for accommodating visitors. Under this plan it will be necessary for those who wish to attend to register in advance.

Attendance at clinics and demonstrations will be controlled by means of special clinic tackets which plan has proved an efficient means of providing for the distribution of visiting surgeons among theseveral clinics and insures against over crowding the number of tackets issued for any clinic being limited to the capacity of the room issuined to that clinic.

#### REGISTRATION FEE

A registration fee of \$5 00 is required of each surgeon attending the 'annual Chineal Congress such fee providing the funds with which to meet the expenses of the meeting. To each surgeon registering in advance a formal receipt for the re istration fee is issued which receipt is to be exchanged for a general admission card upon hi registration at headquarters. This card which is nontransferable must be presented to secure clinic tackets and admission to the evening meetin s

#### BOSTON HOTELS AND THEIR RATES

Since the last Clinical Congress in Boston in 1922 a number of new hotels have been built including the Statler with 1300 guest rooms the New Parker and the Ritz Carlton Some of the older hotels have been enlarged so that there are now ample first class hotel accommodations in Boston for all who wish to attend the Clinical Congress. Many of these hotels are located within short walking distance of the headquarters of the Congress.

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#### CANCER SYMPOSIUM

II sday O tob r 11-Ballroom Copley Pl a Hotel 3 30 P M

ROBERT B GREENOUGH M.D. Boston (Charman of the Committee on the Tr atment of Malgnant Dise ses with Radium and \ran) Report of the Committee

JAMES F PERCY M.D. Los Angeles. Statistical Report of Cautery Surg 13 in Ute ine Case.
George Gray Ward M.D. N. w. Lott. Radium Therapy in Carcinoma of the Cervit Uteri.
WALTER E. SISTRUNA. M.D. ROCHESTER M. n. Chiema of Malig ancy in Cancer of the Breast.
George W. Holling M.D. Boston. Results of V. Na. T. atment in Cases of Cancer of the Breast.

#### PROGRAM FOR EVENING MEETINGS

Presid ntial Meeting Monday O tober 5-Symphony Hall 8 1, P M

Address of Welcome I RI DERIC J. COTTON M.D. Boston. Chairman of Committee on Arrangements. Address of Retiring President. Grorel DAVID STI WART. M.D. New York.

Introduction of Foreign Guests

Inaugural Address The Fvolution of Chine d Mediume and Surgery in Relation to the Preservation of Health and Life Francis H Mullin MD Chicago

The John B. Murphy Oration in Surgery William Bone Lumors. I ROF1 SSOR VITTORIO PUTTI Bologna. Italy

Tuesday Octob r y -Bulir om Copl v Pla a Hotel & 1, P M

Hunterian Oration Grand Curio its Sis Squire Subject M.D. B.Ch. I.R.C.S. London Sympo ium. Ureteral Transplantation

ROBERT C COFFTY M.D. Lortland Or gon Transplantation of Ureters into the Large Bowel CHARLES M McKenna M.D. Chicago, 1 and Results in Transplantation of Ureters

ARTHUR H CURTIS M D Chicago Notes on (1) Management of Ureteral Injuries (2) Surgical Indications in Latients Who Require Uret rul Transplants

CHARLES H MAYO M D Rochester Minn Contributing Causes of Genito Urinary Anomalies Discussion George George Stuffer Smith M D and William Carter Quinby M D Boston

Il ednesday October 10-Ballro in Copley Pla a Hotel 8 30 P II

Special Meeting of the Boston Surgical Society Ir sentation of the Henry J Bigelow Medal Chevalier Jackson M D Philadelphia Bronchoscopy—Past I resent and Future

11 irsday October 11 -Ballroom Copies Pla a Hotel 3 15 I M

PROFESSOR ARCHIBALD YOUNG MB CM FRF18 Glasgow Sacrococygeal Chordoma Sir Charles Ballange K CM G CB MVO Jondon Some Thoughts on the Nature of Cancer George W Crile MD Cleveland The Adrenal Lactor in Hyperthyroidism

COLON' I SIR JOHN LYNN THOMAS K. B.L. C. M.G. C.B. F.R.C.S. Llechtyd Wales. Motion pictures on orthopedic subjects with introductory remarks.

Convocation Friday October 1 -Symphony Hall 8 to F M

Conferring of Honorary Tellow hips

Presentation of Candidates for Fellowship

Presidential Address The American College of Surgeons—the Past the I resent and the Puture Tranklin H Martin M D Chicago

Fellowship Address The Education of the Surgeon WILLIAM J MAYO M D Rochester Minnesota

# PRELIMINARY CLINICAL PROGRAM

# GENERAL SURGEL & GANECOLOGY OBSTITUTES UROLOGY ORTHOPEDICS

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# LONG ISLAND HOSPITAL

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#### MASSACHUSETTS GUNLRAL HOSLICAL

Wonday

Orthopedic Staff-Dry clinics NATHANIEL ALLISON Ful erculo 1 of the knee P D Wilson Tul erculo is of the spine

A MANUTULE THEREIN Tulerculou of the unit K K GHORMLEY Internal derangenent of the k NATHAMIEI ALLISON and ARMIN KLEIN CONGENT I dis location of the hip

J H MI AVS I I RICHARDSON and CL R I H I WI -Thyroid clinic

Morror McIver-3 Ob ervation of burn P D WHITE and HOW ARD STRAGET -3 30 Il he t n

G A LELAND-4 Lascial repair of hern a Surgical Inhoratories open from 2 to 4

#### Tuesd 1y

J D BAR EL R T O YEILL ( C SHITH H H CI VI TRUL and I II COLBY-9 Cento unnity In 1

operation and demon tration of ca es Surgical Staff-11 General surgical operation an 1 d m n stration of cases

W J MIXTER J B MI r and J S Hones N - Surgers of the nervous system operations and demon t ati n

D f Joyes—2 Cancer of the colon and re tum B McKittrick—3 Spinal anosthe ia C A PORTLE—3 to Yray burns J V Miros—4 Utenne blooding

A W ILLIN and P SulTHWICK-4 30 Crult y di ca es of the extremities

Staff-2 Demonstrations in urgical recarch late ato is Drs Young Mallory and Harris LL-3 Cabet Clinic (patholo y)

#### If ed tesday

Surgical Staff-o General surgical operat on DR KAZANIIAN-12 Plastic surgery WYMAN WITHTEMORE and DR LORD- Thoract urgery ope ations an i demonstration of case

R C CABOT and MISS CANNON—2 Social service
H D LLOYD and associates—3 Syphilis is surgery
T W HARMER—3 30 Tendon and nerve suture WILLIAM HERMAN-4 15 I sychiatry and surgery Surgical laboratories open for in pection from to 4

#### Thursday

Orthopedic Service—o Orerations and demonstrations P D Wilson and M Dantorth Arthritis of the spine NATHANIEL ALLISON and KENNETH COONSE Arthritis of the knee

W. ROGERS and W. A. STRAUMER Arthritis of the hip. R. K. GHORMLEY and HARRY LOW. I ohomyelitis. WILLIAM A ROCER End re ult tudies

I racture Service-2 Demonstration of cases B VINCENT-2 Surgery of the spleen

P RICHARD ON-2 30 Herma through the cardiac onti e of the diaphragm Staff-2 Demonstrations in surgical research laborato ie

L Davis-3 Cancer of the cacum the duodenum and common bile juct

J M HANFORD (Presbyte ian Hospital New Yo L) 1 H MILLER and W M SHLDDLY-2 30 Surgical tuber culosis cervical aden tis

I M DALAND-4 30 Plastic surgery

#### Friday

Ether Day Celebration -II P esentation of bust of Dr W T G Mo ton by the \ssoc ated Anvestheti t

of the United State and Canada and the International Re earch Society

ROBERT II GREENOLGH C C SIMMON and associates-2 **Fumor clinic** C FORGE HOLMLS and as ociate - 1 \ ray and surgery

#### 1 LTCR BCNT BRIGHAM HOSLITAN

## Mor day

HARLY CUSHING-2 30 Neuro urgi al clin c 1 R1 CIS NEWTON-3 30 Directiculitis UNANARG I ROTHINGHAM-4 I assing of the Chronic an

pendix
I S LMERY JR -4 30 Study of the results of medical and urgical treatment of penticulce

#### Tuesday

Staff-o to Surgi al operations II \ CHRI TIAN-2 30 Medical diagnostic and thera peutic clinic

( HEIRT HORRAY - 3 30 Cordotomy for the rel of pain I P O HARE-A Hyperten ion and net britt in relation

David Chi Ever-4 30 Sur ical launo tic clinic

#### If ednesd v

Staff-9 30 Surgi al operation
II C Sosux-2 30 Try tuly of mas ive atelectas; of the lung

P GRABITELD-3 Fffect of drug on the nitrogen metabolism

J IN HOMENS—3 50 Treatment of variose ulcer

1 Levini—4 Heart disease in surgery

B Wolfich—4 30 Demonstration in surgical pathol

#### Thursday

Staff—0 30 Surgical operations
W C Quinny—2 30 Surgi al clinic
R H I Irrz—1 Insulin in surgical conditions WILLIAM MURPHS and JOHN POWERS-3 30 Treatment

of secondary anamia by liver diet HARVIY (USHING and TRACY PUTNAM-4 Pituitary land and its influence on growth

#### BOSTON DISPUNSARY

#### Tuesday

H J Incres- Lipsodol injections in the diagno 1 of bronchiectasi and lung abscess

ARTHUR II CROSSIE and HAPOLD CHAMBIRLAIN- CVS to copy and demonstration of ca es

JOSEPH II I RATE-2 Dry clinic importance of the physician to the surgeon illustrated by cas s

#### Il ednesday

JOHN D ADAMS-II Orthopedic operations

HILBERT F DAY-IT Injection treatment of varico e veins demonstration of technique cases and patlo logical specimen

HARRY PRIEDUAN-II Demonstration of malignancies treated by radium and \ ray therapy

#### The sday

1 K PAINE-2 Treatment of gonorrheea in women WILLIAM A HINTON-2 Hinton cholesterol rea tion demonstration of technique and relative sensibility MAYNARD LADD-2 Surg cal a pects of pylor c stenosis in miants

#### HARVARD MEDICAL SCHOOL

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#### FORSYTH DENTAL INFIRMARY

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#### TREE HOSPITAL FOR WOMEN

#### Monday

W P GRAVES and DR SMITH-Dry clini (vnecolog ical pathology demon tration of specim as and lide

#### Tuesdav

W I GRAVES TRANK A PEMBERTON and R C WIDS WORTH-9 Gynecological operations Amputation of cervix and cochotomy (ir t tate pro dentia) permeorrhaphy (second state procidentia) 1 ysterec tomy for fibroid dilatation and curetta e collectomy for retroversion

#### II ednesday

W P GRAVES TRANK A PRIMEERTON and E B SHELBAN - Gynecological operations Plastic and cochotoms (reconstruction operation) lysterectom, for libroid dilatation and curettage collotomy for retro ersion permeorrhaphy for complete laceration of perincum

#### Thi rsday

W P GRAVES FRANK A PEMBERTON and Dr SMITH-9 Gynecologi al operations Amputation of cervix and collotomy for procidentia plastic and collotomy for prolapse (reconstruction operation) hystere torny for fibroid closure of vesicovaginal fistula

#### Friday

W P GRAVES FRANK A PLINDERTO 1 and DR SMITH-Q Cynecolo ical operations Hysterectomy for an er dilatation and curetta e and application of radiu n for cancer Dry clinic Demonstration of cancer c estreated

#### CARNEL HOSPITAL

#### Monday

A R MACAUSLAND-2 Dry clinic Traumatic injuries of the hip joint illustrated

Dry clinic Tractures of the femoral shaft H C LEE-

and of the table of the a wrist joint arthroplasties

D. M. M. Mioney—— Dry clime. Padical operations for carcinoma of the breast and perfo at ag duodenal ulcer with presentation of cas

#### Tuesday

F B LUND A Mck Praser and associates-9 Surg cal operations

I' W Jounson L C PHANEUF and associates-9 Gyne

cological and obstetri al operations

I Brett— Dry clinic Ununited fracture of neck of

femur bone screws in fractures fusion of spine

T B LUND E J DENNING and W I BROWNE-2 Dry

clinic chronic duodenal ulcer

T W Johnson—2 Dry clinic End re ults following in terpo ition operation for uterine prolap e (lantern slides)

#### Wednesday

D T MAHOVEY W T BROWNE and associates-9 General surgical operations

F W JOHNSON L W I HANKUF and assoc ate -o Gyne

cological and of stetrical operations

P N JEF 04-2 Drycling Relative value of various types of operative bone splintin including the mas sive bone graft treatment of chronic arthritis of the spine operatic and non operatic incidence recog nition and treatment of spondylolisthesis over correc tion of deformities in fractures

1 Mck Fraser-2 Dry clinic Cacostomy in acute appendicutes with peritority pre entation of case

I T PHANEUR— Dry clinic The low or cervical case

sarean section (lantern slides)

#### Thursday

F B LUND A Mck, TRA ER and associates-o General surgical operation

I'M JOHASON I F I HANFLE and a sociates-o Gyne cological and obstetrical operations

W R MACAUSLAND- Dry clinic Mobilization of the Ance and elbo s

M If BLOOMBERG-2 Dry climic Scolio is and club foot F J DENNING-2 Dry climic I ostoperative medical

problems pre operative treatment in cardiac cases

L. Phaneur—2 Dr. clinic Uterine bleeding (lantern slides)

#### Friday

D F MINOVEL W E BROWNE and associates-9 General surgical operations

1 W Joir soy L E I HANEUF and associates-o Cyne

colo, ical and obstituted operations

1 Success and B 1 Codyn-2 Orthopedic clinic

L J Denni G-2 Dry clinic Inte tinal parasites in immicrants

W I Brow 15-2 Dry clinic Fractures and injuries of I and and forearm pre entation of special splints

L E PHANEUF-2 Dry clinic Appendi itis and prenancs

#### ROBERT BRIGHAM HOSPITM

#### Tuesday

II \ \ISSE\-2 Focal infection in chronic arthritis gastro intestinal studies

If I Swun-3 Types of arthritis with 1 ray studies and orthopedic principles in il e treatment

#### II ed) esday

P D WILSON-2 Operation for Lnee deformities L T SWAIM-3 Demonstration of orthopedic apparatus

#### Thursday

L M Spear - Circulatory conditions in arthritis L T Brown-3 Mechanical conditions of the low Lack

#### Frid y

P D Wilson-2 Orthopedic operations and demon tration of ca es orthor edic principles in the treat ment of chronic arthritis

#### CAMBRIDGE HOSPITAL

#### Tuesday

Staff-9 Cereral surgical clinics operations and demon stration of case

#### II ednesday

J W SEVER and I' A TINDLAY-9 Orthopedic clini operations an 1 demonstration of cases

#### Friday

Staff-o General surgical clinics operations and demon st ation of cases

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MASSACHUSET IS HOMEOPATHIC HOSPITAL
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NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN Tdy

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CLINICS ON INDUSTRIAL SURGERY At alce 1 to b held the off fthe Md ! D t fth 1m 'I tal Labilty I ta ll b h wn to ill trat d g C mp s t tmentad deult

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li d day F B J COTTON— R truct n ugry d try J rv D Manus—4 I j t the b k Th dy

P D Wilson- I actu f the o calc s plu the ke

Re r lacoby-4 I dutaid mtlgy Fdy

J HN D II GSON- I t of the kull HARRY C SO OMON-3 I d talne I gy
HENRY C MAR LE-4 He

#### PALMER MI MONTAL HOSPITAL

#### Tuesday

Staff—2 Deep \ ray therapy clinic demonstration of prevention of pentoneal adhe ions pathological demonstration

Prevention of peritonent adhe en SHIELD WARRENby ammotic fluid experim neal and clini alire ule

#### II ednesday

Staff-o Operations illustrating treatment of variou t me of malignancy

## Thursday

L S McLittrick Dr McClure and Dr Bivilici-I ollow up and radium clinics general surgery SHIELDS WARPEN—2 I recention of peritoneal adhe ion by amniotic fluid experimental and clini all result

#### Friday

George A Leave Jr and J V Meics - I llove and radium clin cs Lynecology

#### CHILDREN'S HOSPITAL

#### Monday

R B O GOOD W I LADD and associates- Fra ture conference combined surgical and orthopedic

#### Tuesday

Surgical staff-o General surgical operation followed by dry clinic

WILLIAM E LADD Hare in and cleft palate

C G MIXTER Contracture and plastic H W Hubsov Angiomata

G D CUTLER and KENNETH BLACKFAN Medical a p t

of empyema and lung abscess
Orthopedic staff—2 Dry clinic infantile paralysi
W. L. Aycock and E. H. LUTHER Lpidemiology o ur rence erum treatment

S M FireHer Demonstration of apparatus for j re ention

of deformity in early cases

Viss Verruit. Muscle training
Frank Ober Tendon transflantation
I W Ryersov (Chicago) and \ T I Foo Stabilizing

operations A T LEGT Operations

# FRANK OBER Moving pictures Wednesday

W. F. Land R. B. Osqoon and associates-q. Combin d. clime of surgical and orthopedi services present policies in the treatment of glandular intra abdomi

nal bone and joint tuberculosi

B O GOOD W L LADD and associates—2 Combine i clinic of surgical and orthopedic ervice osteomyeliti acute chronic circumscribed Brodie's absce septic joints types of infection and treatment

#### Thursday

Orthor edic staff-o Dry clinic LERED TAYLOR (New York) and J W SEVER Confer ence on obstetrical paralysis with lantern lides and

mo ang pictures
Trefman Allen F Smith (New York) W B Cannon and Y H Brewster Conference on strastic palsy BRONSON CROTHERS and MISS TRAINOR Muscle training

A H BREWSTER Stoeffel operation Surgical staff-2 General surg cal operations followed by

dry clinic C G MIXTER Urinary obstruction and infection W F Lypp Lidney stone

THOMAS LANMAN Herma and unde cended testicle C G MIXTER and S B WOLBICH Lidney tumors pathological aspects

Friday

Surgical staff-9 General surgic il clinic William I I upp Pyloric steno is ALGUSTUS PHORNDIKE Appendiciti

t D Curser Idiopathic regionity

C G MIXTER Intussu ception WILLIAM E LADD Obliteration of bile ducts

Orthopedic staff-2 Dry clinic PLLIOTT G BRACKETT (Cincinnati) and H J IITZSIMMON Conference on torticollis folloy ed by operation

I D Dickson (Kan as City) and R Souther Confer ence on congenital dislocation of hip followed by clo ed reduction and helf operation

# NEW ENGLAND BAPTIST HOSPITAL

# Tuesday

I L Young JR D L JACKSON H B LODER and D J
BRISTOL JR - General surgical clinic operation and demonstration of ca es

#### Il ednesd tv

F II LAHFA and II M CLUTI-9 Surgical of erations
SARA M JORDAN and E KIEFER- Gastro enterolo ical chuic

#### Thursday

E I Young Jr D I Jackson H B I open and D J Brister Jr - General surgical clinic operations and demonstration of cases

# BOSTON LYING-IN HOSPITAL

Tt esday Staff-o Dry chines

B L II MILTON Heart di ease in pregnancy I S Newfll Treatment of pregnancy complicated by heart di ease

S BERMAN End results in pre eclamptic toxemia
F C IRVING Treatment of pre-eclamptic toxemia by re

moval of blood plasma and reinfusion of corpuscles

I C Crattree Climical aspects of pyelitis in pregnancy

C Pratter The po tpartum bladder

II ednesday

Staff-q Obstetrical operations

#### BETH ISRAEL HOSPITAL

WYMAN WHITTEMORE and associates—o daily Ceneral surgical chinic

I' G CRABTREE—9 daily Urological clinic MARK ROGERS—9 daily Orthopedic clinic

HERMAN BLUWCARD Demon tration in medical re earch department

# BOSTON UNIVERSITY SCHOOL OF MIDICINE

(Evans Memorial Building) S R MEARER and A W Rowe- Wednesday and

Friday Studies in sterility 1 W LOWF and C II LAWRENCE-2 Wedne day and Friday Endocrinology

#### THETS COLLEGE MEDICAL SCHOOL

TIMOTHY LEARY-2 daily Demonstration of pecimens illustrating results of traumatism especially cranial and cerebral

# SURGERY OF THE EYE CAR NOSE AND THROAT

#### CLINICAL DEMONSTRATIONS

Tt d \ P M -G oreian Room Statler Hotel

C. B. FALNCS, M.D. Boston, Brain Abscess Cases, Lincodol Injections in Brain Abscess

H I CAHILL M D Boston Report of a Case of Cerebellar Abscess

D. C. SMATH, M. D. Boston, Lingdol Injections in Lung Abscess

LOUIS W. FREUDIAN M.D. Boston Lipiodol Injections in Lung Abs. se and Maxillary Aptra

L W HERMAN M D Boston T o Cases of Foreign Body in the Tracheo Esophageal Wall

H G Tonry MD Boston The R sults of the Examination and Treatment of 1000 Cases of Asthma

I M WHEELER MD Ne York E V I BROWN MD Chicago and GEORGE'S DERBY MD Boston Our Mistakes in Othth Im 1 gs

Il die day P W -G o ei n Ro i Statler II tel

t tion of m nual d ali g with minimum requirements for general hospital caring for ophthal m logical hin logic l and otolaryngological patrints S e detailed program under Hospital Con f rence

II d , P M -G og 1 Ro 1 Statler Hotel

D. H. WA KER M. D. B. t. I. p. R. ading and the Deaf Child. Aid to Hearing

C D KNOWLTON M D B ston Animal Studies in the Regenerat on of the Antral Mucous Membrane L A SCHALL M D B at n M cros op c slides illustrating pathological onditions of the antrum

D W DRIRY M D Bo ton The Results of M tabol m Tests in Cases of Chron c Deafness

Γ B HOLLOWAY M D I hilad lph a Vascular Relations at the Base of the Brain I II VERHOEFF VI D Bo t Onhthalm & Pathology

Fidas PM-Gergia Ro St tl Hot !

I H WAITE M D Boston Diagnosis in Glaucoma W B LANCASTER M D Boston Operation as Minties

A GREENWOOD M D Boston Handling of Secondary Glaucoma

H P CAHILL M D Roston Lantern slide demonstration of serial sections of the ear

F E GARLAND M D Boston Infection of the Submarillary Gland D cussion of Tr atment

\ H KAZANTIAN M D Boston Plastic Operations on the Tip of the Nose

H P Mostier M D Boston Report of a Case of Cavernous Sinus Thrombosis Description of Opera t on Autopsy F ndings (Mic oscopi al slides sho yi g th pathological finding in both eyes)

MASSACHUSETTS IAL AND LAR INFIRMARA

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L B DUNPHY E t ald

E B DUNNERY E t and B S CHS Perim try
H K Messen er Phy 1 gt 1 pt
I At Chardler L ght n
I L Terry P thol gy
Da E Ringewa S Sht 2 bg la

Otol ryngology

H A BARNES-9 Malgnatds e fth c exhib t I case II G TOB Y-9 Sample m st dop at n
PMILIP HAMMOND-O RADC Im t d p t n
H I CAMIL— Wis guebra d n pa flinh l t
f skin graft of the dic l m t d a t) I ten
lded m tat of b cas

De Un Gerr -- o The teth det G L FOREY- Lt lius thrombo th m o

m t t t W R CLE IANN-1 Dmnt to of method fo mk ttf nplyla

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C H POINUE—9 No h T t lachrym lsac p t C T Po INF - o T llet m s D s to d G H POINUE—1 T n llet mes LaF c t change PI MELTZER-I T ill tomie R m val w th ca

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Onbthalmol gy

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N B LANCASTER E, op at s
J B Avera dG S Der y N eye In

MAUD CAVILL Ocular to rc lo
J H WAITE G !!! ta d phthalm c p

A CHA DLER Pe metry

B Sacus External di ca es H & MESSENGER Phy tological optics PAUL CHANDLER Light sen c

T L TERRY Pathology IDAT RIDGEWAY Sight aving cha

#### Thursday

Otolaryngology

V H KAZANJIAN-9 Plastic operation

D C Sayrii o Dry clinic The fluoro coj e and the c moval of metallic foreign bodies safety pin a DR KIRBY-o Baráni fallacie

H P Mosner-to Exhibition of ecophageal instru ments demonstration of the fluoroscopic e amination of the ecsopi agus

A S MACMILIAN-II Lantern slide demon tratim of orsophageri ca e

#### Onhthalmolo v

Staff-o Operation and demonstrations of c e T B HOLLOWAY Thyroid eye ca C A GPEENWOOD Fye operations S J BEACH Refraction with angular type
W B LANCASTER Muscle
II B C RIEMFR Faternal d sea es

I B DOWNY Perimetry
II K Messenger Physiological optics
Paul Chandler Light sen e
T I. Terry Pathology
IDAT REGEVAY Si ht saving class

# Triday

Ophthalmology Staff-o Operations and demon trations of ca es F II Vernoeff Eye operations W H Lowelf Muscles

ANY SMITH Social work

H k Messenger Prysiological optics
PAUL CHANDLER Light sen c

T L FERRY Pathology IDA E PROCEWAS Sigl't sa ang clas

#### Otolary ngology

V H KAZANJIAN-9 Dry cl mic Correction of deform ities of the face and no e lantern slide demoi ta

H P MOSHER—10 Dry clinic Punch tracheotomy
A S MacMillan \ ray of thi mus (lantern slides)
F F GARLAND—11 Hi to ical ext that of laryngest in tru ments

# HARIARD MEDICAL SCHOOL

#### Tuesday

I UCIEN HOWE-2 Ophthalmic ergograph writes auto matically the story of ocular fatigue and relation of this fatigue to eye strain
H P Mosher—2 Mo her Toti lachrymal ac operation

demonstration on cadaver

C B FAUNCE and P E MELT ER Anatom cale libt of temporal bone specimens

#### Thursday

Luciev Howe-1 Ophthalmic ergograph writes auto matically the story of ocular fatigue and relation of the fatigue to eye strain

H I Mostter-2 Demonstration of method in po t graduate teachin, of laryngology

M H I URIF-3 Exhibition of temporal bone specimens

#### CHILDREN'S HOSPITAL

#### Tuesday

I LMAN G RICHARDS and associates-o Dry clinic Lye stricture of the exophagus Tulminating infection of the antrum in children Modified radical mastoid operation in children

LYMAN G RICHARDS EDWIN A MISSERVE and DR CLINE -10 to e and throat operations

# Wednesday

LYMAN G RICHARDS and associates-q Sinus thrombo is in retro pect. Some thoughts on postoperative healing in acute mastoiditi Typhoid fever and mastoiditi in children

I YMAN G RICHARDS EDWIN \ MESERVE and DR CIENE -- to No e and throat operations

## Thursday

I YMAY G RICHARDS and associates-o Dry clinic Som bronchial foreign bodies and exteriores attend ing their temo al 1 group of lary ngeal obstructions with tracheotomic complications Bronchiecta s in children

I MAN G RICHARDS EDWIN A MESLEVE and DR CLINE -10 Nose and throat operations

#### CARNEY HOSPITAL

#### Tuesday

William Liebury - Die operations and demon tration of ca es \ ray localization and magnet extraction of foreign bodic

#### Il ednesday

I D HURLEY and W S LIFBUAN-O I se operation and demonstration of ca es

#### Tlursday

WILLIAM I EBMAN and H BORNCHOFF-9 Eve operation and demonstrat on of cases

Friday W J SHEEHAN and F G MINITER- Otolary ngological chaic

# MASSACHUSI TTS HOMEOPATHIC HOSPITAL

#### Tresday

W D ROWLIND-O Die clinic F W Colbury and H L Barcock-o Aural clinic

#### Thurs 3av

W D Kowkind-9 Eye clinic C Smrn C W Bush L R Johnson R O Parks and W W Warreng Nose and threat chine

## Triday

W D ROWLAND J C STLENBERG II W EMMOVS and I I SAIRBALL-O Eye clinic

#### BOSTON DISPENSARY

#### Tuesdav

II J INGLIS-2 Beck Schenk snare method of ton d lectomy

#### Il edi esday

Toseph G Skirball-10 Tye clinic demonstration of ca es esternal disease, perimetry ophthalmol orcal

Ti & sday

I I SEPRILL-10 Ocular lues

#### ST ELIZABETH'S HOSTITAL

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CAMBI IDCE HOSPITAL

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NEW ENGLAND HOSPITAL FOR WOMEN

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BETH ISRALL HOSTITAL

BOSTON CIFY HOSPITYL

CAPNIA HOSHTAL
E D Hereta-o d la Fa la c

#### ANNUAL HOSPITAL STANDARDIZATION CONFERENCE

Monday 10 00-Ballroon Copley Pla 1 H t 1

GEORGE D STEWART M.D. New York Pr. 181107 Addre s of Welcome | I REDERIC | WASHBIRN WD Boston Director Massachusetts General II) pital

The Rôle of the American College of Surgeon in Imi o n Hospital Service Grorge D Stewart VID Ve v York President American College of Surgeon

Pre entation of Annual Report of Ho pital Standa liza tion and Announcement of Approx d Li t for 10 % M T MACEACHER M D Chic go As ociat Director American College of Surgeon and Di e t r of Ho pital Activities

Health Inventoriums in Approved IIo pt 1 —Further Pro ress of Research TRANKLIN II MARIN M.D. Chicago Director General American College of Sur

The interest and Insuence of the Duke Endowment in Ho pital Standardization W S RANKIN VI D Charlotte N C Director The Duke Endo m nt Nur e Patients and I ocketbooks May Visa Buk E S

Ph D New York Director Committee on the ( ad

ing of \ursing School

General Di cu sion Charles F Williamy M D Bo ton Director of Beth Israel Hospital WILLIA & DARRACH MD New York Dean College of Ph 1 ian and Surgeons Columb a Univer ity Mary M ROBERT R N New York I ditor American Jou nal of Aurs ing and Charles H Mayo M D Mayo Clini

#### Mond v 00-Ballroom Copl v Pl a Hot l

GEORGE D STEWART M D New York Pre id n Mi ed Pedagogic Opportunitie Incident to the Usual Organization of the Re ident Vedical Staff of th Hospital Henry A CHRISTIAN VI D Boston Herry Professor Theory and Practice of Physic Harvard University Medical S hoot

Medical Education and Specialization William C Rappleye MD New Haven Director of Study

Commiss on on Medical Education

Experimental Science versus Imitati e Art in Medicine E Murray Blair M D Vancou et B C What Is the Rôle of the Ho pital Administrator? F F
CHAPMAN Cleveland Director VIt Sinai Hospital

Vi ual Methods in Conducting the Staff Conference (Illutrated) C G Parall M D Rochester A 1 Director Rochester General Ho pital President-elect Ameri an Ho pital Association and HARRY D CLOUGH MD Rochester NY As istant Medical Director Rochester General Hospital

General Discuss on CHARLES H YOUNG VI D Portland Maine Director Viaine General Hospital and John T BURRUS M D High Point \ C Surgeon High

Point He pital

# Tuesday 9 30-B ll om Copley Pla a Hotel

JOSEPH B HOWLAND M D Boston Supe intendent

Peter Bent Brigham Ho pital Pre iding
The Fducational and Leonom Value of the Out pat ent
Department n a General Hospit 1 James Raglan
Miller M D Hartford As 1 tant Gynecologist and Obstetrician Hartford Hosp tal

Selecti e Econom c Basi Ior Out pat ent Service (Illus trated) Beatrice Kai fr Det o t Clinic Lyccutive

H rper Hospital

Vinimum Standard for the Hospital So ial Servi e De partment Wiser R Wilson R \ Boston Dire for Social Service Department Children's Hospital

The Operation of a Physical Therapy Department from the S lentific and Leonomic Standpoints John S COLLTER VI D Chicago Assi tant Professor of Physical Therapy Northwestern University Medical School

Di cu sion Michiel M Davis Ph D New York Consultant Ho pital and Community Surveys and Frank Granger M D Boston Director of thysical Therapy Department Boston City Hospital

Tiesday oo-Ballroo Copley Pla a Hotel

Clin c on Case Record in Hospitals Directed by C W MUNGER M D Valhalla V 1 Director Grasslands

What Constitutes a Good Case Record? FRNEST LEROI HLAT MD Worcester Surgeon and Director of Surgical Services Worcester City Hospital

What Yet the Best Vethods of Apprasim, Case Record
HAROLD W HERSEN VI D Brid eport Superin
tendent Bridgeport Hospital
What I art Should the Record Librarian Play in Promoting

Liffcient Case Record in the Hospital' GRACE W.
Myers Boston Librarian Imeritus Massachusetts General Hospital

How Best Can Good Case Record Be Maintained in the Small Hospital Where the Usual Diff culties-Lack of Internes Shortage of Funds and to Historian or

Record Librarian—Are Frequently F und? CLARA
1 DOOLITTLE Derby Conn Historian Griffin Historian Griffin Hospital and President Connecticut Hospital Hi torians Association

What Are the Most Effective Ways and Means of Stimulating Good Case Records? EMMA C. BLACK New Haven Record Librarian Grace Hospital

What Should Be the Functions of a Record Committee of the Medical Staff? E. W. WILLIAMSO, M.D. Ch. cago. Chief Field Representative American Colle e of Surgeons

What Are the Most Effective Means of Leeping Current Case Reco ds up to Date? R C BUERKI M D Madison Superintendent Wisconsin General Hos pital

What Are the Relative Ad antages or Disadvanta es of the Various Filing Systems? LDITH VI RODBINS Boston Chiel Record Librarian Peter Bent Brigham Hospital The Organization and Functioning of a Central Record Department Genevieve Chase Boston Record

Librarian Massachusetts General Hospital

#### Hednesday 9 30-Ballroom Copley Pla-a Hotel

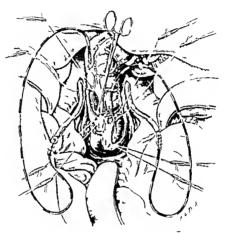
Open Forum—Problems Involved in the Professional Care
of the Patient Directed by Lewis \ Sextox M D
Hartford Superintendent Hartford Hospital

Measuring the Professional Efficiency of the Ho pital Joseph C Doane M D Philad lphia Superintend ent Philadelphia General Hospital

Standard of Surgical Efficiency George W Swift M D Seattle Surgeon Children's Orthopedic and Ling County Hospitals

Medical Staff Organization T T MURRAY Albany Superintendent Memo ial Ho pital





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# SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED MONTHLY

VOLUME YLVII

NOVEMBI I 1928

NUMBER 5

# TRANSPLANTATION OF THE URFTERS INTO THE LARGE INTESTINE

BY I OBIRT C COITIY M.D. TACS I ORTHAND ORTGON CI IF 1 18 g y b ty 10 g M d 18 hool

#### FUNDAMENTAL PRINCIPLE

I would seem that the valve is the only mechanism by which fluids and gases at a given temperature may be transmitted from a chamber of low pressure to one of higher pressure. Without the controlling influence of the valve the tremendous energy of expanding steam and gasoline would be futile and powerless. Therefore it may be truthfully said that without the valve principle our present envilopments.

A valve is a non-motile movable gate or obstruction which is located at the threshold or in the course of a cavity or canal and which automatically closes and prevents reflux during the intervals between intermit tent applications of the necessary force used in the transmission of fluid matter from an area of lesser pressure into one of greater pressure. In the higher animal mechanism there are various conditions under which it is necessary to tran mit vital fluids forcibly Under all of these conditions and in all of these locations non-motile membraneous valves are found. The most important of these valves are those connected with the heart and blood vessels, and those at the entrance of the prefers into the bladder and of the bile duct into the duodenum these valves human life and indeed all higher animal life would be impossible. Therefore

it may be said that the valve is the most fundamental principle or mechanism connected with the activities of our world

CIII ONOLOGICAL STEPS IN THE DEVELOPMENT OF THE OPERATION

Since the dawn of modern medicine doc tors realizing the successful arrangement of the cloaca in fowls for the common reception of the urine and freces have hoped that under certun circumstances a similar arrangement might be surgically produced in the human being A review of approximately 250 articles dealing with experimental attempts to produce this condition has shown that not one author had up to 1900 constructed a true non motile valve such as exists in ordinary mechanics or in the cardiovascular system at the mouth of the ureters or at the mouth of the bile duct The presence of muscle fibers near the outlet of these channels seems to have misled the investigators All reports of experimental attempts to transplant the ureters into the large intestine of dogs prior to 1909 fuled to reveal a single instance in which a series of live dogs with undamaged kidneys could be exhibited There were three notable instances however in which a degree of success had been attained by a near approach to the de sired solution Since these three operations have caused a certain amount of confusion I shall therefore in the interest of clarity and

of fairness quote from the reports published by the three authors

To ler operation George R Fowler in his Treatise on Surgery (1906 in 313) described his operation as follows

U eteral and rectal anastomosis offers an ideal method of daing the the meon end ces and discembers of astrophy of the bl dd r were it not for the lagr of no ton f the ladney

In the s in his limple ted the eters into the return per tengthe open gof the former by me sofall if mucous membrane and further povid g agaset infect on the place g the uriters in the graspitch return fiber of the botel vall the pitch appear of the mean and distinct the pitch and the past in the graspitch and the past in the grant per note that our per per not be a oung man has appared by suffered nincome of from the presence of the opening of the uriter to the return of the results.

The tour step of the technique are shown in Figure 1

It will be ob erved that Fouler attributes the suc ess of his operation to two features the mucou membrine flip within the bowel and the muscular action of the intestinal wall around the uretur.

It is at once apparent that this little tongue of mucous membrane after the cateut attrching the ureter to it has absorbed would hang as a loose tag in the intestine and would gradually atrophy. All o the muscular action around the ureter would be no greater than any other direct implantation. And yet Fowler's operation succeeded in this case Why did it succeed In Figures 1 A and B showing the outline of the tongue of mucous membrane in the diamond shaped space it will be observed that above the cut flap is a mall trangular area of mucous membrane (indicated by an asterisk) which has been loosened from the muscular coat for the short pace intervening between the point of en trance of the ureters at the upper angle of the wound and the turning in of the mucous flap For this distance the ureters actually ran between the mucous coat and the muscle as indicated in F and G (identified by arrows) Figure 1 L shows a sectional view of the mechanics of the operation as described in the text by Fowler 1 and G show what really happened as a result of the Fowler operation as shown by his pictures Arrows point to the

submucous space traversed by the ureter. This space corresponds to the space in A and B indicated by the asterisk. G indicates the probable result in Fowler's successful case. The mucous flap hangs as a usele is ta Airons point to the short submucous space traversed by the ureter which constitutes a short valve. This feature of the re ult was apparently overlooked by Towler. Our present day success with implantation of the ureter shows that without doubt this factor accounted for Towler succes. He had mad vertently applied the principle of submucous implantation and had not recognized it as an essential part of his success.

Martin operation Ascarly as 1898 Franklin H Martin was absorbed in a dream of the radical removal of the uterus and blidder for cancer which involved both of these organiand fully recognized that the chief desideratum in this connection was a practical disposition of the ureters. The following para raph gives his view on this phase of the question at that time

Traisf italion if unclers to the real symmod first ris the method which literature i decates has been accepted as the une table one by the major ty of e permenters in spite of the objections which may be urged against it. In me texpanients in this line I have accepted the lor bowel as the best substitute for the bladder first because it possesses reservoir room second because it because it possesses treatment of the individual and finally and principally because it has a perfect sphineter out it also complet by und rither control of the undividual.

No more earnest industrious and intelligent experimental surgery has ever been done in connection with this subject than that of Martin. For several years he worked on minuals attempting to solve the problem of transplantation of the ureters. During this time he had at least one dog that survived the operation for 3 months and at postmortem examination showed a fairly good kidney. Nevertheless Martin gave up in de puir as to the value of experimental work, and expre-sed himself in the following words.

I am convinced that work on animals will nev resolve the probl m of ureterorectal anastomosis. The care of an animal cannot be such that o c can minimize as in the human se eral sources fadager of infection. For example, Gravity, as it is

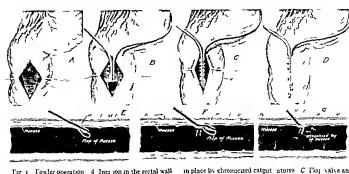


Fig. 1. Fowler operation 4. Ince non m the rectal wall includen the crous and muscular costs. Mucous men I arec expo ed in a diamond sliped area and the edges of the inci ion retracted by thread zet cross. The dotted In eshors the line of section of the mucous membrane to form the tongue shiped flap B. Tongue shaped flap cut and turned back. The ureters are placed with their objugies and I juig out the urface of the flap and cound

brane D Showing the longitudinal incision in the bow wall closed by a row of silk sutures. The uterets are slow parm, into the upper angle of the closed incision. E is and G mutho sunter iteration of Fower testingue. I C and D redrawn from I owler. I Treatise in Surgery left kidney can be taken as a criterion of what is the expected after such operations the results might be considered in a more five adult light. It is possible that this left kidney shows what would not be taken as a criterion of the considered in a more five adult light. It is possible that this left kidney shows what would not be taken as a criterion of the considered in a more five above by the considered in a more five above what would not be taken as a criterion of the considered in a more five above.

ends of ureters placed in the rectum and a row of chrom cized catgut sutures closing the gap in the mucous men

exerted on the urine of the ureters in the upright human is lacking in the horizontal animal. The rectum of the human patient can be rendered and maintained relatively clean. The usual location of the implantation in the animal (antenor or lateral wall of the rectum) makes the mouths of the ureters at the most dependent portion of the bowel when the animal is lying standing and walking much more subject to infection. The opposite is the case with the human and too the patient can be so controlled that ureteral catheters can drain the ureters for several days after the operation and the mouths of the ureters protected cuturely from infected material thus giving a start and an immunity when the resistance of the ussues are at their lowest time.

As far as the printed record shows Martin was never able to realize his dream of trans planting the ureters coupled with removal of the uterus and bladder for carcinoma. He reported on one dog which lived 3 months and at the postmortem examination was found to have a furly good kidney as shown by the following pathological report by Professor Zeit of the klebs Pathological Laboratory.

The absence of pychtis in this case contrasts markedly with the findings of former postmortems before this Society and speaks in this case against an ascending infection from the rectum up if the left kidney can be taken as a criterion of what is the expected after such operations the results migh be considered in a more favorable light. It is possible that this left kidney, shows what woul have become of the right kidney if the dog, had bee allowed to live. The left kidney showed in the middle of the convex border a nodular appearance similar to that of the granular kidney of chroninterstitial nephritis)

This was a better result than had bee accomplished by previous attempts at direct transplantation of the urefer into a dog bowel by other investigators

The following is Martin's description of his operation

1 Hace the patient in a Trendelenburg po ittor make the abdominal incision so is to expose the rectum pick back the omentum and intestines make a longitudinal incision of the peritoneum over the ureters down to their insertion into the bladde and dissect them out with the finger to a beight cabout 3 inch s. The each ureter near the bladde with strong silk and sever it above that point.

Bring both ureters forward and approximat them in front of the rectum by including the wall eeach in one fine silk suture tied in a hard knot an armed at each end with long cambric needles Approximate the ureters further by fine catgustures passed through the outer valls of the uriters only securing the 2 tubes parallel for a distance of 2 to 3 centimeters. Place the severed end

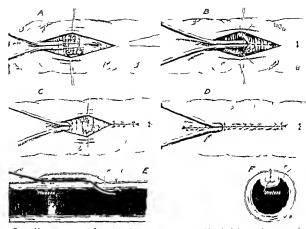


Fig. Mit prit fitth | jith dithm | tth udm lithth to udm litht the udm lithth to udm lithth the udm lithth udm liththu udm lithth udm lithth udm liththu udm liththu

f the uct r on a gau spong hie weutig the

3 Mk a long t linal nc to 2 t ches long though the pirt n al n I subp nt n al ti te did the upp r all f th b I and d sect h k th t u s that the o vl s f f th mu culur t f th t u n xp d th lingh f th pinn s c si nin th I and i n h id at it entr Me flap ar h ld apart b silk st t o t n ula

A Miternakingsur th the bo elist of the utaat Alternakingsur the the bo elist office il
matt and have gas u dit abo elist of import
relation growth of the life genough to admit
the the strong the life growth of the continuer of me the life growth of the life

mad for the urct s nld at the eters through the nn g to the point at which the upper stay silk found its t

5 Ele ating the t ur t statright gl to the low label six a laing the mby the uppristars like seene them to the fibr u and mucous coat of the low lit, numb refetchely appl leature off crigg tor silk use ggent are of to pen trait the muo ur coat of the u ters. The ur tay the hid pirallely the fibe bow loon the len lit prione the low random silk in make taut thu causing non-erson of the denud learner to the bow life additional uttu passel seur gith ur to the musculf cot of the tree as it rolled in by the te's on

6 Th urt 1 no bured in the m scul r coats f th bowel by overfold g the cots for a fut the 1 state of 2 to 3 c nt met rs then in son being facilitated by making tension the for silk, handling string and s curing the motor the urter s by fine caterus sutures

7 The peritoneal coat of the bovel is now closed over the urelers to the point where they separate and then below them above that point. This is accomplished by a running inversion stitch of sift. A few additional interrupted sutures at sift, or catguitate, the peritoneal coat to the outer coat of the peritoneal coat to the outer coat of the

8 The ureters should be left protruding into the bonel when practicable at the end of the operation so that the unnerafter the catheter has been removed will be carried off and discharged at a distance of a continueters from the point of their entrance into the bowel in order to protect the wound in the mucous membrane from contact with the urine

While this reference to the catheters had not been mentioned in the description of the operation and the catheters have not been shown in any of Martin's pictures in another place in the paper describing the operation for removal of the bladder the following stitement occurs

At the stage of the operation when I am ready to draw the two ureters into the bould I would advisplacing a rubber ureteral catheter with an endopening into each ureter for a distance of a inchesite two free ends being temporarily plugged. The two catheters are thrust through the opening in the bowel and as the urreters are guided into the opening by means of the fixation and handling silks the free ends of the catheter should be drawn out through the anus and the plug removed and their free ends placed in separate receptacles. After the ureters are secured the eatheter should be fixed to the edge of the anus by two silkworm gut sutures.

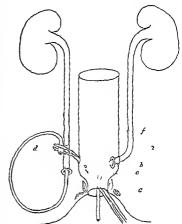
He states the principles and purposes of his specific technique as follows

a The ureters should empty into the bowel in the direction of its long diameter from above down ward so that the urine shall be discharged in the

direction of the facal current

b The ureters are buried in the walls of the rectum for a distance of an inch or more longitudin ally so that in the act of defrection the faceal mass will close the caliber of the ureters by its pressure on the mucous membrane and that pressure severted from above downward in the direction of the onward flow of urine thereby emptying the ureter by a milking process

c. The ureters are further protected by the muscular coat of the intestine. This is recomplished by surrounding them in their longitudinal course through the intestine to the event of centime text by the muscular coat of the bowel. This muscular coat of the bow I no acting from above downwrid milks the unne downward and foolds the ureter closed when the rectum is admi, in defacation when the contraction and closure due to defrecation is over the urine will spurt forth with considerable force acting as a cleanser to the ureters.



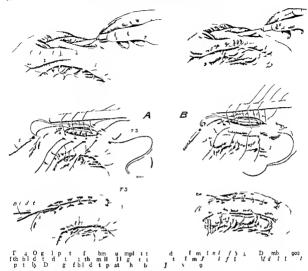
In 3. Peters operation. Scheme of tran plantiti nof ureter into rection is extrapentioned medical. If utering transplanted position with B to etter of badder mixture membrane and muscle. Contheter statch sinto ureter by source at B and protriiding through P it and protriiding through P it amis D forcers passed by 10 a runs throw in the opening in the boat d and grasping the catheter I reflection of perito norm

While it was Martin announced intention to produce a valve he in reality produced a sphincter. There is the following difference between a sphincter and a valve.

A valve is a non-motile movable gate or obstruction which is located at the threshold or in the course of a vessel or tube and which automatically acts to prevent a reflux of matter from an area of greater into one of lesser pressure

A splineter is a motile innervated gate or obstruction which is located at the threshold or in the course of a cavity or cand for the purpose of retarding the onward or outward flow for the convenience of the biological or animal mechanism

I valve is equilly active in an animate ind in manimate mechanism. A sphineter is effective only when animated or innervated



In the animal mechanism a valve is found where the activities of vital or ans are to be certainly protected. A sphincter is found where function is to be improved. The true valves of the body such as those which pro tect the outlet of the ureter into the bladder of the bile duct into the duodenum of the heart into the aorta function just as well after the patient is dead as during life sphincter ceases to function during paralysis or at death A sphincter is a ring of invol untary mu cle fiber under the control of the nervous system and therefore subject to remote reflex or psychological influences as exemplified by such pathological states as cardiospasm pylorospasm vaginismus blad der strangury and spastic sphincter ani The true valves of the body contain no muscle fibers and respond to no influence save that of the force they are intended to control Martin's technique was not succe sful because he did not cut the muscular coat and thus chminate it from the structure of the valve

chaminate it from the structure of the valve. The presence of the phincter of Oddi near the outlet of the bile duct and the extra accumulation of circular muscle fibers near the outlet of the ureter have apparently miled investigators into the belief that these muscles are sphinicters for the purpose of preventing reflux while as a matter of fact pluncters are never used for this purpo e. It is possible that these circular fibers in both of these instances act like the accelerator unner muscle in the urethra and serve as an accessory force by injecting the bile or urine through the space beneath the valve into

the crivity of the intestine or bladder after which the manimite flap of mucous mem brane acting as a separate structure auto matically closes to prevent reflux

Peters operation Practically coincidental with the publication of I owler's statement in his book and of Martin's work came the publication of a paper by George A Peters of Ioronto under the heading of Iransplantation of the Ureters into the Rectum by an Intraperationed Method for Exstrophy of the Bladder which was published in the Brit is Medical Journal June 22 1901 Peters operation was a modification and an improvement of the Mandl operation which in reality is not simply a transplantation of the ureter but includes the ureter bearing segment of the bladder into the rectum Peters description follows

On July 15 1899 the patient was anæsthetized and the parts were disinfected as thoroughly as possible. The sphincter was well stretched and the rectum having been previously cleared by a purge and enema was washed out with an antiseptic solution of non poisonous strength. A fair sized sponge to which a tape was attached wis then passed into the rectum as high up as possible. This not only prevented any passage of facal matter but assisted materially in ruising the anterior wall of the rectum toward the bladder Turning now to the bladder a Jacques soft rubber catheter (Fig 3 c d) about No 5 (English) was passed for about 2 inches into each ureter. The part containing the eve was cut off so that the urine entered the opening upon the end of the catheter freely A silk suture was then caught through the extreme end of the ureteral papilla (Fig. 3 b) once or twice and was also pas ed by a needle through the substance of the catheter so as to effectually prevent its slipping out as it was the intention to retain these catheters in position at least 48 hours. Care was observed not to obstruct the lumen by passing the thread across it or by tying too tightly. The distal end of the ureter with a goodly rosette (Fig 3 b) of bladder muscl and mucous membrane was then directed free the eatheter affording an excellent guide to its position The idea was that whatever virtue there might be in the peculiar termination of the ureter upon the inn r surface of the bladder should be retained when the transplantation was completed. As soon as the entire thickn s of the bladder wall (which is here uncovered by [critoneum] has been snipped through with seissors or scalpel blunt dissection may be employed and it will be found not to be difficult to free the lower end of the urcter along the

wall of the pelvis without injury to the peritoneum Both ureters having been isolated the whole of the bladder tissue was remorselessly ahlated from

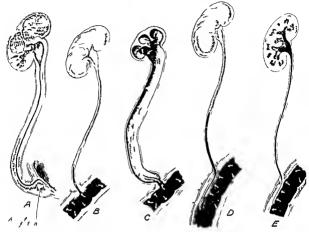


In 5. The modus op rand in the 1 hery of urine into the intense is Segment of intense in it to of retherows and intense in the intense of the transmit and the state intense leading to the the may help remove the been red; ed by a 1 gg lown and of a peristalities at rows in the state fluid following in the state of the period to we will be a been opened by the relatively genter fressure in the ureter and the urine is being delicated into the intensities. C. After pass age of the periodities when some again as umen a state of rest and the value is again also umen as the to feet and the value is again also umen as the offer that of the value is again closed by stati intra intestinal pressure indicated by the a row.

the perimeter where it merged into the skin to the prostate where the vesculus seminales debouched (During this dissection great care must be taken not to expose or injure the peritoneum and if its hazardous proximity be suspected a portion of the bladder muscle may be left though every vestige of its mucous membrane must be removed. In my case, the peritoneum gave no trouble whatever and was never in the least jeopardized.)

The next step was to expo e the lateral aspects of the rectum at a point below the reflection of the peritoneum (Fig. 3.1). The deep di section was found to be surprisingly case and by pressing back the retrovesical cellular tissue I was able to expose the interior and lateral walls of the rectum with radine s. This part of the operation was greatly facilitated by an assistant who inserted his finger into the rectum and lifted it into the wound

The final step of the operation was the implanta tion of the ureters into the lateral walls of the rectum and this was accomplished as follows



lgo 4T dgft m tgime dill dimplit Dill bm mplt tt lell BD tmpltt ft 1 th 1 LUdm tki 1 lt hhi bwl CD dkd iditi 1 bhl lw lmu mpltt

W th h s fing 13 the rectum the on rator c f lly det rm e th xat pont at hi h the mplantati n t b made The r qui it qualifi ( ) It mut be boxe th internal sphincter (Fig 3 ) ( ) It must b in the lat r land not n th nt r ll so as to void kinking (The actually ocur lan the first stee in the uthors c e ne tat ng a subsequ nt adı t m nt of th impla tati ) (3) It must be high e ough up to p mit th tircte to p oj ct sl ghtly to ch to th lumen of th bo 1 ith t str t h g (Fg 3 b) If the ur ter th s proj ts it f ms papilla ih h h n pre sed upon f om th n th to l b c m s c nverted to a I sim I to that at the entran of the ble d th saliv ry d ts This point having bend dd upon the prato or he as tant a s! nd forc I though the nus pesses thm ganst t from the r tal pect and lft it carefully into the ant or wound Th wall of th bo I no neised upon the poje t g fo ceps hch s th n forced gently through By st etch ng and cutt g we enl rge th wound with great

exactness so that the ureter with its co tained cathet will acc rat ly fill it a d v t not be in ju ously press dupon Th fo pa o ope d made t gapth dtl nd of th cathtr (Fg t th b 1 nd out f th d withdr the op tor at the am time ca f lly d ecting th u trthrugh th slt a lsati fving h mself th t ts t rm at on forms a pap lla at l ast I h long p th ectal m cou su face I gud g th m uth of the rtr thro gh the ht n the r t l all on myp the freeps back agam h d the catl tr to grap th dge f the rosett of bladder ts u a ou d th ur t I pap ll ď The pocts is rp at d upon the other th Iray n vith care not t d sp ge plug is n Thrsmtb onecsit) tub the th t for stitch g the ureter 1 p t an l I d d not attempt it Th cath t I ft in po tion t least radays or utlth vem av of them n mv c n bout 6 hou

The Peters operation 1 mo tingeniou and has succeeded in the hands of a number of

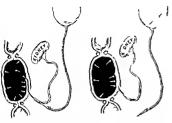


Fig. 7 Segment of intestine into ... hich the ureter was implanted for days prior to removal of specimen. The pre-sure within the intestine clo. es the ... div. bl. pre-sure on the mucous membrane. Not a drop could be forced back into the duct.

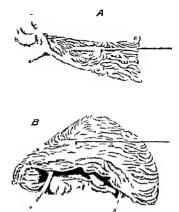
Canadan and English surgeons By making the operation extraperitoneal supplemented by drainage Peters practically eliminates the danger of serious infection By transplanting the valve mechanism at the end of the ureter from the bladder into the rectum he has saved the kidney from intra intestinal pre sure but he in no way utilizes the fundamental principle of surgical valve formation. Therefore his operation is only applicable to existorily of the bladder.

If Fowler had drawn his ureter through a stab wound (indicated by a circle in Figure 1A) in the lower angle of the diamond of mucous membrane instead of in the upper or proximal angle or if Martin or Peters had cut through the circular muscular layer of the intestinal wall down to the mucosa for as much as one half to r inch a satisfactory technique would have been evolved by each of these men prior to 1900. They omitted to do this because the problem itself had not yet been isolated and dehined

It would seem that a combination of the I eters technique with the submucous tube technique described later in this article might be the operation of choice for certain cases of existophy of the bladder

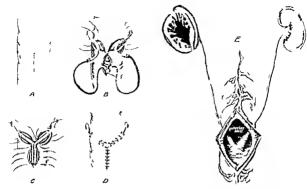
#### ISOLATION AND DEFINITION OF THE PROBLEM

The problem itself was discovered by accident as an incident in the course of another line of research



I = 8 Comparison of urgically produced valve 1 with normal valve in do a bladder  $\hat{D}$ 

In 1908 at the suggestion of W J Mayo I took up the study of the problems connected with pancreatic surgery For this purpose an animal hospital was constructed and specially equipped. In certain experiments on the pancreas it was found necessary to transfer the delivery end of the common bile. duct to a location lower down in the intesting as a preliminary step to surgery of the pan Transplantation was done by the direct method which had been recommended by W J Mayo (Γιg 6B) t When the abdomen was opened for work on the pancreas itself 2 weeks or more after the transplantation I found that the duct in every instance was enormously dilated In one instance it was practically as large as the duodenum itself The dilation extended all the way into the lumen of the bowel including the opening in the intestinal wall itself. At once the thought occurred that the intra intestinal pressure must be greater than the intraductal pre sure Hence the dilutation of the unprotected thin walled duct The solution must be in a study of the mechanism used by nature Therefore



I of Bill plil f tith me the glands to de Thopfoltill it Details i

the relation hips of the delivery end of the duct were tucked in the living dog. It was found that contrary to the mysterious oblique penetration through a complicated muscular wall which had been taught by some author ities the duct first penetrated the muscle then ran immediately beneath the loose mu cous membrane for a di-tance before it emerged into the lumen of the bowel principle were further studied in dogs bladder by the construction and application of a similar arrangement to inanimate rubber tube rubber ba and rubber valves. The solution of the technical problem seemed The duct mu t he under the loose mucous membrane for a distance before it enters the lumen of the inte tine

The first method was to mike a stab wound through the muscular layer insunate the point of a forceps for a distrince between the muco a and mu cle spread the forcep to separate these structures then with the point of the forceps puncture the mucosa about an inch farther along insert a grooved director

through this can'l pass it for an inch farther on along the inside of the intestine then pa s a threaded needle attached to the end of the split duct along the groove and bring the needl out through the intestine about 2 inche below the entrance through the pen toneum and muscle wall. In this way it wa hoped to drug the duct through this little canal and anchor it on the inside proved to be more difficult than was antici pated and the method was abandoned for a simpler process which con i ted of an inci ion 1 or 11/2 inches long through the peritoneal and muscular costs Through this inci ion the muscular coat was separated with the handle of a knife from the mucosa \ stab would was made at the lower end of the exposed muco a and the duct dragged through this opening by a needle and thread which was attached to the split end of the duct as shown in Figure 4 1 The cut edges of the severed structure of the inte tinal wall were drawn together across the duct This left the duct lying under the mucous membrane in

Fig to Preparation of the lowel and u eters. I Bowel clamped needle having inserted B Cross section showing washing out the bowel C Tack  $n_i$ , with give D Sigmoido operand larj need forcepe u ed in a caring the  $p_i$ . No 12 u eteral catheter cuff of rubber tubing T Splitting the urete  $G(q_i)$  in erted into the uret T and the du place by suture Note one suture is tellured 1 above the cuff H Catheter fa tened in the urete T Showing packet. The function of tie gauge in drawing, ureters through the wound

the same relative position to the layers of the intestinal wall as that existing between the delivery end of the duct and intestine in a normal condition

This operation was performed on 6 dogs under the same circumstructs and conditions as were present in the former series of cases of direct implantation. The result was that whereas the ducts were dilated in all cases of direct implantation no dilatation of the duct

was found in any case in, crised the space between that true mucous coats. The problem and the column had been spaced and

Abstract problem Tresis of fluid

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Solution Production of for high Specific problem of a secreting organ the little f

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pre ure mu t be low in l regular into a second hollow viscus in which the pre sure is high and irregular

Specific solution. The production of a valve from the non-motile mucous membrane of the second values.

Specific t Insigne Having the duct of the first viscus run between the mucosa and musculars of the se ond viscus for a distance before entering its lumen.

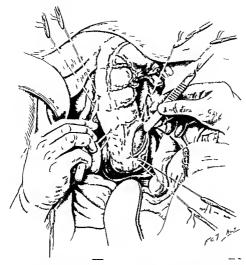
For miking all effects e The pen tiltic wave in the econd viscus and in the duct itself (Fig. )

The results of the e experiments on the pain creal mediculal to which were the discovery and isolution of the problem involved in the transplantation of the duct into the interms werepre-ented before the meeting of the Southern Surgical Association in 1900 at Augunt Hot Springs under the title Paincreto entero tomy and Lancretectomy and print edistinguishment of Surgery December 1900. In cloning the discussion on this paper I made the surge too that this same principle might olive the problem of urreteral transplantation.

Immediately after this presentation and publication I began a series of experiments on the urcters using the same principles. The results were reported and specimens exhibited to the Surgical Section of the American Medical Association at St Louis in June 1010 under the title Physiological Implan tation of the Severed Ureter or Common Rile Duct into the Intestine Illustrations for the technique adapted to the implantation of the ureters (Fig. 4 B) were submitted and published with the report in the Journal of the Imerican Medicul Issociation (1911 lvi Leb 11) The results of these experiments which were preceded by repetition of bile duct experiments were summarized in the article as follows

In 5 dog with direct implantation of the ble du t ill soc im n sho sed ma ke i dilatatio th a log in which the lut was transplated by the ulmurous method non showed Hatation of the du t Oí 6 dog in theh dir et implantati th u tr sas performed 5 ded with pso eph o sar ult fthe p rati n while the sixth liv dand was kill lorday aft roperato whin its sfind that the kil sith the implanted uniter halbe tol Ha I stroy d lea ng only a h ll of fib ou hil the ur t r v s dilated nd r mained on (I g 6c) Thus e er, ureter a dev r. bel lut which was transpla te ! directly into th ntest ne without als fo mation dilat I through out is tent luding its p g nto the tes t nal lumen On the the had of o dogs in heh th u ters had be n implanted by the s bruce s m thod 4 bad d l operate d ath f om g ne omplatin such sm b encount red f rm of mplicat labd minal urg ty The 5 hich r or reliam the imm lit flects of the or ra tion show d und mag | k dneys an | undilated urt swhenth log i r kill dat period r ng g from 60 to 67 day after oper tion specmens hen test ish did the le actio the dad 1 t sti a with as nother in meally the dad it still a with as nother ing I ligur 7 is shown a pot more more more ment in chivas made in all of the cas Soprift as this vale in or instace that weight a d st pping on th by using my ent betructed intest e ruptur of the b s thout cruss g a r flux of the fluid through the ur I r which had been t ansplant d All the other mens n the ser s sho d similar alve pro d ction Figur 8 shows th similarity of th valve which has been surgically e struct dun the cou of the sul mu u implantati of th ureters to th no mal valv in a dog s bladd r

Is far as I know this was the first time that a number of undamaged dogs kidneys



The 1 Traction loops in place for lolding bowel while inc. ions are made. The lower or left 1 or ion has been made the muscularithe handle of the kinfe eparating the mulcle from the mucous membrane.

ad been presented before any society follow g transplantation of the ureters into the well fortunately Dr Chriles H Mayo as chairmen of the Surgical Section of the merican Medical Association at the time is work was presented. He saw the kidneys in the valves in the intestine produced by ite implantation as well as the technique and ecognized the importance of the presenta on that had been made.

Dr Mayo's contribution Dr Mayo's relationship to the development of this operation very direct. Had it not been for his sound inical judgment remarkable skill and his anding in the profession it is entirely possible that the completed procedure which we representing now might have been delayed or many years for I must admit that there are been many times when I have been

discouraged with it myself. Dr. Mayo's results always inspired hope and renewed energy

After I presented this experimental work and the technique described in Figure 4 it was nearly years before I saw a case in practice to which I could apply it. In the meantime Dr Mayo had used the operation on or 3 cases for exstrophy of the bladder so that to him belongs the credit of being the first to perform this operation on the human While Dr Mayo has never claimed to have added any vital point to the technique of the operation he added the following personal touches which materially helped to clinicalize the procedure He used fine catgut instead of linen he left off the control suture at the upper end of the implantation wound he used curved rubber covered clamps for hold



Ig 3 P kig pg u

taba d m

ing the intestine he supplemented the interrupted sutures with a continuous catgut he called attention to the advantages of implanting, the right ureter first low down in the rectum and at the same time fastening the parietal peritoneum to the intestine near the anastomosis to days or weeks later he transplanted the left ureter into the sigmoid

In Osler's memorial volume Dr Vlayo's article on exstrophy of the bladder sums up his experience at that time

In o r senes of 52 patients 6 were operated on by the plast c method \( \tau \) ded 6 months later (traumatic extroph) at childb (h) 3 patients wer operated on by the Maydl Movinhan method of whom did furemia Twenty six were operated on by the tri plantation method 22 successfully 2 of these patients had but one buffere each. Four died

shortly after operation. Seventeen of the 52 pat ents wer not op rated on at the time of their exam na tion some of them we too young and are to be oper ted on later others with diseased or dilated unteres were advised against the operation.

In the Journal of the American Medical Association (Ixxva 624) C H Mayo and Walters reported 35 cases operated on between 191 and 191 m which the ureters had been transplanted for exstrophy of the bladder with remarkable results (To date Dr Mayo has done the operation on 93 patients).

In addition to Dr. Mayo's work. Dr. W. E. Lower of Cleveland has performed a number of ureteral transplantations by this first technique. I have transplanted something like 14 ureters by the original technique while



I is 5 Ureter being anchored in place

a considerable number of individual operators throughout the country have performed this operation successfully by this method. There has always been a considerable element of danger and difficulty in carrying out the proper technique by this original method It has also been impossible to transplant both ureters at the same time with any degree of safety probably due to the fact that the adema following the operation seems suffi event to shut off the flow of urine into the intestine for 2 or , days and results in a uramia in addition to the sepsis

Because of these difficulties and dangers few have had the temerity to recommend the operation for anything besides exstrophy of the bladder except in rare instances lins always been very disappointing and I have always hoped that we would be able to develop a technique which would make the operation safe enough to justify its use in many other conditions which occur much more frequently than exstrophy of the bladder

### DEVILOPMENT OF THE TUBE METHOD

On January 27 1925 I was holding a clinic for the Northwest Section of the American College of Surgeons One of my cases was a



1: 16 Ureters I used in the intestinal wall by sutures

cancer of the bladder for which we were to do a transplantation of one ureter as the first stage of the operation. On opening the abdomen to my great dismay I found the ureter dilated to the size of a man's finger wound was closed and no operation done

About March so another patient was referred to me with a hopeless cancer of the uterus bladder and the vesicovaginal sep-The patient had had a great deal of distress and presented a picture of despuir The relatives were informed that the only thing that could be done was to transplant the ureters after which we might use large doses of radium To this they consented and on April 4 the abdomen was opened through the right rectus muscle with the view of transplanting the right ureter. It was found dilated to the size of my little finger. The incision was then enlarged and the left ureter inspected It was diluted also. The operation was being performed in the presence of a class of senior medical students and while dis cussing it I evolved the following plan Mobilize and sever the ureter insert a small rubber tube well up into the dilated ureter Place a trong bnen thread around ureter and tube in order to anchor the tube to close ureter against intestinal infection to stran



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gulate ureter and permit of automatic removal of tube later | | Fubes and catheters had been u ed by others before in connection with urcteral transplantation but not in this way and for the same purpose) After the intes tural wound was prepared in the usual way the mall tube through a stab wound in the inte tinal mucosa could be attached to a rectal tube which had been passed up through the anus Withdrawal of the rectal tube would draw the ureter into the intestinal wound prepared for it. The ureter could thus be implanted submucously in the wall of the bowel in the same way as if no tube had been This was done. The patient was not inconvenienced at all by the operation more than is experienced in any other abdominal operation The kidney did not cease to func tion for a moment in fact it was discharging urine through the tube during the operation and afterward About 7 days after operation the tube came away and the ureter discharged urine into the intestine in a normal way



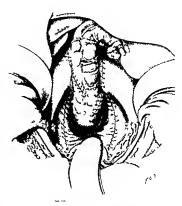
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On April 18 we opened the abdomen on the left side and train planted the left treter in the same manner. This kidney also began to act at once and there was not the six hite t disturbance. from either of these operations [Tor convenience of later reference this ca e will be designated. Case \(\circ\).

By the use of the tube to transmit the unner through the ordematous tissue surroundin the anastomosis the kidney functions just as if the ureter was brought out through a lond wound or through an abdoninal wound Therefore it appeared that both ureters in his be implanted simultaneously with the same degree of safety that accompanied the implantation of one ureter and there seemed to be no good reason why in certain cross at least the bladder could not be removed and the ureters implanted making a complete operation at one sitting

In the meantime the patient (Case I) whose abdomen we had explored and aban loned as hopeless as far as transplantation of he dilated ureter was concerned continued to suffer severely and insisted that something be ione regardless of the risk. It finally occurred that possibly the left ureter might not be dilated so that on February 1 opened the abdomen on the left side and found that the left ureter was not dilated. We there fore transplanted the left ureter into the sig moid by the original submucous implantation technique. In due time the kidney began to deliver its urine into the bowel and worked perfectly The urine from the right kidney of course kept up the continuous distre s and strangury in the bladder but we had in mind ligation of the right ureter for the purpose of killing the right kidney or even doing nephrec tomy as soon as it could be established that the left kidney was doing full function the meantime we had transplanted the ureters in Case \ by the tube method so that instead of killing the right kidney as planned we again opened the abdomen on the right side and transplanted the right ureter by the tube method on April 14 1925 (Case 1) The patient was immediately relieved of his bladder distress We used some large doses of radium in the open bladder to destroy the local growth if possible Finally the patient was discharged He was secreting urine perfectly and was able to hold it as long as 6 hours When last heard from 8 months after operation he was still quite comfortable although his growth was gradually depleting From this time on we were unable to trace him as he had moved to eastern Canada After the transplantation of the second

Arter the transplantation of the second ureter in Case \( \) in which the tubes were used a large dose of radium was used in the vagina for the purpose of destroying the foul odor About weeks after the last transplantation an abscess developed in the abdominal incision through which the left or second ureter had been trinsplanted. The abscess was large and sepsis was considerable. The patient died of exhaustion about 6 weeks after the second transplantation. Clear urine was dischirged through the rectum up to the time of the death of the patient. A postmortem



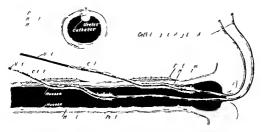
Γ1º 19 Completed operat on w thout drainage

examination showed the right kidney to be in splendid condition the left kidney was filled with multiple abscesses which seemed to have extended up the ureter from the abscess which evidently emanated from the site of transplantation

#### EXPERIMENTAL SUFGERY

The result of this postmortem examination sharply brought out the fact that there were other problems vet to be solved not the least of which was local sepsis emanating from the site of implantation Plans were therefore carried out for doing experimental surgery on a larger scale than we had hitherto done Space was procured in connection with the University of Oregon Medical School order to guard against every fault in tech mque my full surgical operating team was brought into the work The most pressing problem to be solved was that of cleansing the lower bowel in order to free the field from sepsis as far as possible. A plan was decided The lower bowel must be isolated Accordingly rubber covered stomach clamps were placed across the sigmoid above the field of operation A large needle (No 13 Lewishon





To 21 Scheme of bilateral tran plantation of arcte's tube to his que Sectional views

amount of success followed their use but they were never a complete success. The ordinary ureteral catheter was difficult to hold in place and its caliber became obstructed very fre quently by incrustation within the lumen Therefore a search for larger sized ureteral catheters was made. Finally it was found that C L Bard and Company of New York made ureteral catheters of sizes as large as No 12 but owing to the smooth surface of such a catheter there was no way to anchor the ureter to the catheter Therefore a small cuff of soft rubber tubing was slipped over the catheter and fastened by a ligature or two making a perfect anchor. After we had solved all these problems the results upon dogs were much better than we had had before

One very interesting experiment was made in the way of bringing the ureter diagonally forward on each side of the rectum in a diagonal slit. The two slits came together at a point on the front of the rectum from this point of convergence a single slit was made an inch or more down the front surface of the rectum Finally a stab wound was made at the lower end of this anterior incision and the tubes and ureters drawn through a single stab wound (Figs o A B C and D) This was a very convenient operation and the experimental results were very good (Fig. 9 E) It is barely possible that this operation may have ment but we have not so far done it on the human being

Many other details were worked out until a very definite and workable technique had been completed Our experiments showed very clearly that the tube technique not only carries a lower mortality but also gives better functional results afterward than the original transplantation without the tube. However the principal superiority of the tube method is that both ureters may be transplanted at the same operation. The final results of the operation on dogs were not tested out by me but an article published in the May 1928 issue of the Journal of Urology by Charles Morgan McKenna of Chicago supplied the missing link. I have his permission to quote from his article

I thought it would be desirable and valuable to make some experimental investigation with a view of ascertaining what such kidney function pathol ogy and bacteriology may be following urc teral transpluntation. For this purpose, we have operated on 14 dogs and r human being using the Coffey (tube) technique

The work of ureteral transplantation was started in October 19 5 The first 5 dogs operated on died At autopsy the same patho with one exception logical condition was found in each dog Death was not due to the Coffes technique but to our own fault in carrying it out. In these dogs, we failed to draw the ureter far enough into the lumen of the bowel and secondly there was too much tension on the ureter the result being a suppuration at the site of transplantation into the bowel and hence an ascending infection into the kidney producing an acute pyclitis and general peritonitis. Lerfecting the technique by taking away all tension from the urcter after transplantation and introducing the ureter far enough into the bowel produced results and we showed that the urine emptied freely into the luman of the bowel The dogs made a good re covery from the operation and were allowed to go



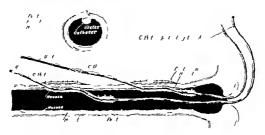
It I il is a the tible to be the little litt

transfusion needle) wa procured and attached to the tube of an intractor. A genoidoscope wa inserted into the rectum the water turned on in a larke tream and allowed to run until the water came clear through the signoid oscope. All the water was then drained out through the ignoido cope and the obturator was reinserted and the instrument passed up to a point near the damp obstruction. With long, larvingeal forcep, gauze strips were picked into the gut through the signoidoscope until the rectum appeared stuffed. This was a great improvement as the gauze not only

made the intestine easy to handle but ab sorbed all the moisture in ide the inte line Furthermore the ureteral tubes could be attached to the gauze instead of the rectal tube

The next obstude that was encountered was spasm of the dogs ureter which made it very difficult to introduce a soft tube of sufficient size to curry the urine for more than a day or two Livery type and variety of tubing was tried. Finally silver tubes and gold tubes were constructed to which the rubber tube might be coupled. A certain





a Scheme of bilateral tran plantation of ureter tube to har jue S ctional vic is

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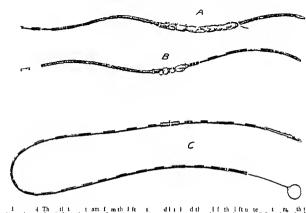
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o to complit n ale en e and were later studi d f function d bat ri logs and n lly pathology W ar r po ti g th results only of si gle tran pla tati s f r th r ason that n th se d gs the

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vas oper ted upon D ember 7 195 The lift urt as 1 lat d a d traspl t d into the gm id by th s m technique s pre ously de r b l ln ths perat on the sigmoid was fasiened t t h lit ralpel c all by one atgut stitch

O Jinu 'a o 6 th dog as 'good condution and contain d t mp ove throughout the ne t var O F buarr 7 9 7 1 var d 2 months aft th first o at th dog x agan anarchtzd and a m dhe en io m de The left ut r as olat d then ess d and a urteral chetrins t d The easter adhesions about this tof anast mos but not marked. The right uter vas allo 1 olat d incred and a atheter ited. A kidney function test w doe enhe

num ter of ph nol ulph ephth lem being us d th th f llo i g r sults from the right kidney the dv ppear d i g m nutes in good concent a ton from th left kidney the dv appea ed in 3/ m nutes in g d con entrat on The dye showed 2s per cent on tach side in 15 minutes. The dog was kiled a tith cetter. Autops, sho ed that it right kidney was entir ly normal. The left kid ey w s smaller than the right and was scarred at both poles. The car sule as scarred and th ckened at the poles. The pelvis and ureter were of normal s e. The mistomosis was well healed but ther vissione thick in 19 of the left uretral vall in the dittal third. The opening if the distal portion of the left ureter into bladd r was not found.

Dog? A small brown mile was operated upo Dec mber 5 19 5 The operation const d 1 anistomosi g the 1 ft ur t r to the sigmod th structech que as ha b n pr vossly destr bed b ing us d This dog made a complete recov ry a d 2 y ar later (February 1 1027) was again annes th tize d the uret its were isolated incised a d cithet in d Urine was coll cted for culture. The functional test slove d the app ar nee of the diversity within 3 muntes from each kd ey. The dig was a good concentration In 15 m nut 5 th dye show d 12 pr cent on the 1ft s de and 24 per cent on the

The dog was kill d with ether Aut p y reveal d the an tomosis well healed and the left kidney of normal size There was very slight scarring of the

right side

capsule The right kidney was enlarged the ureter thickened and marked hydronephrosis was present No scars were present. The ureter was patent and a probe could be passed from the ureter into the bladder. There is no explanation for the hydrone phrosis on the unanastomosed side unless pelvic in fection secondary to operation caused a peritonitis Dogs 8 9 and 10 were operated upon December o 11 and 13 19 5 respectively the Coffey technique is previously described being used

On February 8 19 7 1 year and 2 months after operation these 3 dogs were anæsthetized in the same manner as Dogs 5 6 and 7 The right ureter which had been transplanted in the previous operation was isolated and a double ureteral cathet crization was done by making a small shi in each urcter A kidney function test was done i cubic centimeter of phenolsulphonephthalein being used

with the following results

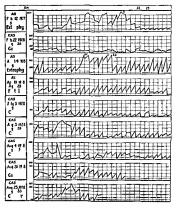
Dog 8 The dye appeared on the good side in 3/ minutes and on the right or transplanted side in 4 minutes The function on the left side was 2 per cent in 15 minutes while on the right it was 18 per cent Bucteriology was negative on both sides

Dog 9 The dye appeared on the left side in 3 2 minutes and on the right or transplanted side in 4/ minutes Function was equal on both sides 21 per cent in 15 minutes The urine was negative on both sides

Dog to The right ureter was found to be slightly larger than the left. The right was the transplanted side In the dye test the dve appeared on the left side in 3/2 minutes and on the right side in 6 minutes Laboratory analysis showed colon bacillus in the unne from the transplanted side and sterile urine on the left side

In this case the transplant was made into the bladder instead of into the bowel Hydro ureter and hydronephrosis were marked especially the hydro ureter This was due to a constriction of the ureter at the place where the transplantation into the bladder was made. We tried to use the technique as in the bowel but apparently the bladder does not work with the same valve like mechanism. In other cases where we made a transplantation into the bladder we found we were inclined to get a hydro urcter which proves pretty conclusively that the Coffey technique is the one of choice in the bowel

Those who have had experience with transplantation of ureters in dogs will appre ciate the remarkable success of Dr McKenna in which he has had 5 consecutive ureteral transplantations in dogs in which the animal lived more than a verr and in which practically normal functional results were obtained I very surgeon who has had both experimen tal and clinical experience realizes how much more difficult it is to get results in the case of a dog than in the human. The dog seems to



Γig 23 Comparative temperature chart for all case

have poor resistance to colonic bacteria and this particular operation is far more fatal in the dog than in the human

### TECHNIQUE

It goes without saying that the fundamental proposition forming the background of any successful technique for transplantation of the ureters into the bowel is that valve action must be produced. A valve to be always effect tual must be unanimated and uninfluenced by muscular structures The mucous mem brane is the only available structure meeting this requirement and is the one which has been universally used by nature for such a purpose The fundamental point in the tech nique is that the ureter must be made to run immediately under the mucosa for a dis tance before it opens into the lumen of the

The two other important features to remem ber are

A The kidneys are vital organs and life can last only a short time without their function Therefore the operation must be so arranged as to interrupt renal function as little as possible After every wound an

exudation which produces a certain amount of swelling takes place in the neighborhood of the wound It seems that when a ureter is tran planted the swelling in the wall at lea tan certain in tance temporarily retard or completely block the flow of urine from that kidney. If both ureters have been tran clinted without the provision for the free pringe I urine the patient will often die ir m uramia simetimes the swelling does not all truct the ureter but it i senerally con celed that biliteral tran plantation of ure ter without the provision a very dancerou provide a up t the error interruption of renal function during the days immed rately after operation, three plans have been n (d

1 Tran plantation of one inveter at a time through eparate metron the operations bein from 10 day to week apart

Uniliteral (r biliteral tran pluntation of ureter preceded sometime before by

biliteril nuphra tomy

The tube or eatheter technique in which eath fer of sufficient or are used to transfer the fluid through the operative field hirm, convale cence

By the firt plan two major abdominal operation are necessary. By the second plan two 1 m met in are made at one time followed later by an ibdominal operation. By the third plan the tube or cathleter tech inque only one peration is required and only one ab forminal incision.

B Ihe speritten must be done in an e entially eptic held. Infection emanating fr in the site of transplantation is often fatal and i alway, detrimental to the final result. Therefore every effort to sterlize the field and produce an a eptic operation should be made. The lan for bringing, about an aseptic held is equally applicable in each of the three plan.

There will be times when each of these plan it usathe typ of technique described in \$t I oms 1910 (Fig. 4 B) might be made ne essays because of the smalling of the uretur the inhibity to ecure proper tubes or catheters or in an emergency in which a ureter has been injured. I I fur (Himmas) will be indicated when the ureters are too much dilated to permit of transplantation into the bowl in which case a bilitaral nephrostomy combined with ureteral eatheter in the ureters would permit the ureters to become reduced in size and also permit the infection to be cleared out by irrigation, the transplantation operation to be done later at an opportune time. It might also be indicated in sub-standard patients or in cases in which an obstruction at the neck of the bilidder has temporantial timinged the kulturys. I lan a should be used a routine procedure except for the special indication, alreads enumerated.

I summe that the operation is to be done on Saturday an ounce of easter oil is given on Thur day and again on I riday morning. On Indas evening and again early Saturday morning the bowel is flushed with a hi h enema of clear water A la ht diet is given on Friday and the patient is induced to drink all the water possible At 7 oo 1 m. Saturday 4 grain of morphine and 1/150 grain of atropine are administered and a rectal tube i placed in the rectum to carry off any fluid which may come down. A ceneral and thetie is started at 8 00 a m. An inci ion extendin from just above the umbilious to the pubic bone is made ju t to the left of the middle of the abdomen. All the inte tine except the sigmoid are earefully packed back and held above the promontory of the sacrum with a 3 and pack of gauge A thin bladed curve l rubber covered stomach elamp is now placed on the sigmoid 1 to 14 inches above the anus thus isolating this lower segment

The patient is now drawn down to the end of the table \(^1\) that the buttocks protrude beyond the table \(^1\) A skilled as istant inserts a signordoscope 30 centimeters long into the rectum and on into the signoid guided by the operators left hand manipulating, within the above of the sistency of the signoid guided by the operators left hand manipulating, within has been firstened a bevieled edged needle (No 13 Leusshon transfusion needle) 1 coupled to the tube of an irrigator which 1 arranged at considerable height. The needle 1 thu it through the wall of the signoid jut below the clump and the water is turned on. The signoid cope is drivin down so

that the end is within an inch or of the anu

The water when it begins to flow through the sigmoidoscope usually contains small par ticles of fæcal matter and mucous As soon as this is entirely clear 500 cubic centimeters of a 1 per cent solution of mercurochrome is put in the irrigator (as suggested by Dr L L McArthur of Chicago, in a personal commun ication) After the irrigation is finished and the fluid has entirely drained away through the sigmoidoscope the obturator is again inserted and the sigmoidoscope under the guidance of the operator's hand within the abdomen is pushed upward to within an inch of the obstructing clamp Sterilized gauze packing folded from a strip of gauze 4 inches wide and extending to a length of about 10 feet is now used to pick the lower bowel For this purpose a laryngeal forceps with a straight shaft of somewhat more than 30 centimeters is used. As the assistant from below introduces the gauze with forceps the placing of the gauze is guided by the operator s left hand within the abdomen As the bowel is filled with gaure the sigmoidoscope is gradually withdrawn The assistant is care fully instructed to include a considerable mass of gauze in his forceps so as to prevent the end of the forceps from injuring or pene trating the intestinal wall (Fig 10) Alter the segment of bowel from the clamp down ward has been filled with sterile gauze the patient is drawn back on the table and placed in a moderate Trendelenburg position

The posterior parietal peritoneum is now incised over the most convenient approach to one ureter Through this incision the ureter is located and picked up on a smooth retrae The incision is extended both ways as much as needed to expose the field finger curved under the ureter is slipped down like a hook toward the bladder freeing the ureter of its connective tissue and pushing down the structures of the broad ligament in a woman to a point as near its entrance in the bladder as possible. Under the guidance of the left index finger used as a hook a small Kocher clamp is placed on the ureter other is placed just proximal to it The ureter is now severed with a knife (I ig ii) The distal stub of ureter is tied with catgut just below the forceps If no dramage is to be

used the stump should be cauterized with carbolic acid The other ureter is lifted in like manner and the two clamped ureters are drawn through the upper end of the wound If drainage is to be used (and my personal opinion is that it is safer particularly for one doing his first operation of this kind) gauze is packed into and over these slits in the peri toneum while the further steps of the opera tion proceed (In order to keep the steps all clear the peritoneal shits have been left

exposed in the illustrations)

Two No 12 whistle tip ureteral catheters have been sterilized and prepared by fastening a cuff of rubber tubing on the catheter about 6 or 7 inches from its tip. At the other end of the catheter is fastened a double linen thread armed with a round needle to be used in fastening the end of the catheter to the gauze within the rectum. The end of one of the catheters has been sloped for identification The clamp holding the ureter is taken in the left hand while a knife in the right hand splits the anterior wall of the ureter. A catheter is now inserted into the first ureter down to the rubber cuff Two strong double linen ligatures are now tied around the slit portion of the ureter and around the anchor cuff A third strong linen suture is placed around the ureter above the cuff for the double purpose ol completely shutting the intestinal con tents off from the ureteral canal and of fur nishing strangulation of the ureter at this point so as to form a line of separation later (l 1g 10)

Attention is next turned to the intestinal part of the operation The lowest point in the sigmoid at which the operation can be con veniently done is to be considered the site of election Using two incisions I have found it more convenient to transplant the left ureter in the lower incision The lower end of the upper or right incision should be at a higher level on the intestine than the upper end of the lower or left incision. The incisions are made diagonally about an inch and a half in length extending from the mesentery's edge downward and toward the midline of the intestine While on dogs I have successfully and easily performed the operation in which the incisions were made on the same level and the ureters brought out through a single opening (Fig. 9) and while Charles Morgan McKenna of Chicago experimentally and Herbert Coe of Seattle chinically have transplanted both uniters through a single longitudinal meisson with separate stab wound in the mucosa for citch of the two ureters. I think two separate incisions at different levels is possibly the best plan. Using this plan two traction loops of No o catigut in which both ends are left long tre placed at each end of the proposed inci on about. I inch apart and including the muscular coat of the bowel also including any nearby vessels which cross the meisson and which much bleed during the operation

With traction loops made taut the surgeon with a tine bladed knife carefully makes each incision through the peritoneal and muscular With the handle of the knife the mus cular coat is pushed off the mucosa (Fig. 1.) The ureter is now placed between the two upper traction loops of each excision. With a tine harp pointed knife a small stab wound is made through the mucosa at the lower angle of the incision. A very tine Halstead mosquito forced is thrust through this tiny opening where it seizes a bite of gauze within the intestine (lig. 13) and pulls a small bit of the gauze through this puncture gauze in the c two wound the two catheters are sewed (Fig. 14 frontispiece) It is important at this juncture to determine and record which ureter contains the catheter with the sloping edge

It this point the nurse beams to withdraw the cauze from the anus As the gauze begins to tug on the lower catheter the surgeon carefully guide the end into the bowel The gauze is pulled down until the end of the lower catheter comes through the anus Then the pull is made on the catheter. When the end of the ureter around the cuff approaches the wound it is sometimes necessary to dilate the opening in the mucosa slightly o as to permit the ureter to enter the bowel After it is pulled down comfortably taut the nurse again pulls on the gauze until the end of the other catheter approache the opening This cathet r is pulled down in the same way as the first one At this point it is just as well to remove the remainder of the gauze because

it may be inadvertently picked up by a suture and may make trouble in pulling it out later

With the ureters lying comfortably in their relative incisions the two traction suture at the lower angle of the lower incision are made taut A fine curved needle threaded with No. 000 chromic catgut double thread is na sed through the peritoneum and musculature of one side of the incision and picks up a good bite of the ureteral wall then the other side of the intestinal wall thus fixing the ureter in the lower end of the wound (Fig 15) It is probably well to use two sutures which take a bite of the ureter. The sutures are usually tied as they are placed rather than all left loose as shown in the illustrations. The other sutures pick up the intestinal wall just outside of the incision and roll the ed es in over the ureter These may be of No o cat gut The traction loops may now be cut or tied together and another line of sutures either continuous or interrupted may he used to cover in the first line (Fig. 16) The ureters after the operation is complete should be covered in by peritoneum and not left exposed to the intestines

If drainage is to be used a continuous suture begins to bring the edges of the peri toneal incision together just above the ureter After the second or third stitch the inner ed e of the peritoneum is dropped and the outer edge is drawn over to the side of the intestine where it is sutured and from which point the continuous suture follows the intestine down ward partially covering the line of suture As it approaches the lower end it turns out ward toward the inner cut edge This leaves a retroperationeal space through which any infection that may emanate from the line of sutures may travel downward to a drain (lig 17) The lower part of the incision is left open The four ends of two double wicks are placed in the lower angle of each peri toneal incision Two more double wicks are placed in the cul de sac I wo folded sheets of gutta percha tissue cover in the gauze so that no intestine can touch it and the wound is closed leaving this quarantine pack cominfrom the lower end of the incision (I) One week after the operation the gauze wicks are carefully and separately withdrawn 4 to 7 days later the gutta percha is removed and the wound is allowed to heal of its own accord

The method of construction of this quaran tine drainage is described in Annals of Surgery June 19 7 Some of course may prefer simple rubber tissue drains some tube drains Because of the danger of intestinal obstruction around such a drain however I think it is better to use no drainage at all than to use anything except the quarantine which I have described This method of quar antine drainage makes the operation very safe Undoubtedly many operators will prefer to do the operation without drainage If the ab domen is to be opened later for such operation as removal of the bladder it would be more convenient to have no drainage at the trans plantation operation

At the end of the operation  $\tau$  fold of parietal peritoneum is drawn over the ureter to the intestine ( $\Gamma_{12}$  19)

There will he times when proper tubes may not be wailable or when for other reasons it will be necessary to transplant the ure ter without a tube. In such cases, the same method of cleansing the bowel which has been described for the tube technique will be equally applicable. The dangers and difficulties which were experienced in the past in connection with unilateral transplantation without the tubes will be greatly abated The same technique as has been described for the transplantation by the tube technique will be applicable except that the end of the ureter must be fixed by a suture to the inner side of the intestine distal to the wound of entrance In order to avoid the embarrass ment of picking up the gauze within the in testine on the needle carrying the anchor suture a grooved director is passed through the stab wound and its point made to lift up the wall of the bowel A curved needle carrying the unchor suture is then passed along the grooved director where its point punctures the intestine. The needle is then drawn through and by pulling on the thread one can drain the end of the ureter inside the

intestine By picking up a bite of the intestine

near the place where the anchor suture has

come through one may the a knot so as to anchor the split end of the ureter in place (Fig o) The sutures are then placed by the same technique that has been described for the tube technique

## POSTOPERATIVE COURSE

During the progress of the operation sub pectoral infusion of normal salt solution is given for the purpose of increasing the flow of urine as well as supporting the patient Sometimes the urine discharges throughout the course of the operation On the other hand it is sometimes 3 or 4 hours or even longer after the operation before the urine discharges in any amount. The ends of the catheters are covered with absorbent cotton which is fastened on them with adhesive plaster As soon as both catheters begin to discharge freely the covered ends are kept in a urnal which has been sterilized. While the operation is as a rule unusually free from shock it is a fact worthy of note that the pulse in most cases has been fairly rapid for a few days Subpectoral infusions are used freely for the double purpose of sustaining the patient and increasing the output of

Occasionally a little blood appears in the urine of a kidney and in one instance a little clot formed in the catheter but was easily sucked out by aspiration. Hinman has sug gested washing out the catheter with cent horic acid solution to keep the opening In one instance a catheter stopped running because of incrustation of urinary deposits inside the catheter By cutting off an inch or of the cutheter the urine started again If the operation has been in a child for exstrophy of the bladder and the tube has been smaller than No 8 and hecomes ob structed it may be necessary to put in a speculum under anæsthesia and to cut the catheter loose from the ends of the ureters This was done on the fourth day in Case 1 of this series. This procedure was first carried out on one of my cases by my former asso cirte Dr Wayne J Stater who later wrote of it in the Aorth est Medicine

If the ureters are dilated and ædematous the catheters sometimes come away as early as the fifth day If the ureters are relatively normal in structure they remain longer and come away between the eighth to sixteenth day

If urine stops flowing through a No 12 catheter it will usually be found that the ureter inside the rectum is beginning to slough and leak The tube is then ready to come out An interesting fact has developed in this connection. The part of the ureter which protrudes into the intestinal lumen dies back to the mucosa and when the tubes have remained more than 8 days all that portion of the ureter within the intestine comes away with the tube Figure 22 shows the typical appearance of the two tubes and the piece of ureter that they bring with them. The long piece came from the right or upper ureter In this case the ureters were dilated and very thin at the time of operation They came away 5 days after the operation at least one ureter first leaking into the bowel which led to the removal of the tubes at this time | The right ureter pulled out with difficulty possibly too much traction was made on it. At the upper end will be noticed a small strip of tissue which is probably a piece of ureter which pulled out of the side Leakage of urine followed at this point. It i probable that this ureter was still intact and that the tube was simply obstructed

My associate Dr Paul E Spangler has recently hrasel a small bulh on the end of a piano wire which he can push down the catheter so as to remove obstruction of any kind With this wire the catheter may be kept open. The wire cannot be pushed through the whistle tip opening and yet it completely cleans the lumen (Fig. C)

In only one case was the treeter cut off by the isolation ligature which was put on for that purpose. Almost every patient had a distinct rise in temperature about the time the tubes came away sometimes lasting for 2 or 3 days. Twice slight chills occurred at this time with fever. In two instances pain was noted in one kidney while the tubes were in depite the fact that the kidney was detainging clear urine. In both instances this passed off without any serious consequences in one instance Case: in which an assistant

punctured the right side of the sigmoid with the sigmoidoscope a certain amount of local infection took place. In this case quite a severe and prolonged fever followed after the tenth day with definite pain in the re ion of the right Lidney. This was thought to have heen due to an infection in the neighborhood of the right implantation which was made near the point where the puncture had been sutured. After the beginning of the third week, the patients recuperate very rapid by and so far we have had no evidence at all of late involvement of the kidney.

CASE r A baby boy 20 months old referred by Dr John Hoyt of Spokane Washington had exstrophy of the bladder with small ulcers over the exposed mucosa. He had a temperature of 100 degrees on admission to the hospital Bilateral transplantation of the preters was carried out on Tebruary 12 1927 No 8 m histle tip ureteral catheters being used. The ureters were dilated and thickened A small rubber to sue drain was placed in the lower angle of the wound outside of the perstoneum On the fourth day after operation the flow from the catheters ceased After the patient had been given an anæsthetie the eatheters were cut loose from their anchors Definite ridges and nipple like protrusions marked the opening from the two u eters On the eighth day after operation the patient began to develop fever On the twelfth postoperative day the fever was very high and lasted for about 5 days then gradually diminished No further trouble was noticed The last report r year after operatio sho ed that the patient had not had any trouble as a result of the operation and was in perfect health

Case 2 A female age 38 years had a hopele by neutrable carcinoma of the vagina and bladder which originated in the cervix. Bilateral tran plan tation of the uneters was carried out on February 22 1928. No to catheters were used. These were removed on the tenth postoperative day a p. co dead ureter coming with each tube. The bladder was entirely releved and the kidness functioned perfectly. They were delivering urine into the rectum without distress 6/month after operation although the growth was constantly spreading in the broad ligaments in spite of the heavy doses of random which were used.

CASE 3 On April 4 1928 a 13 year old hoy was operated upon at the Doernbe ber Hospital Port la d Orgon in association with Dr. W. H. Bucer mann for extrophy of the bladder. No r ureteral cath ters were used. The rectum was accidentally punctur d by the sigmodoscope and the wound was soutured within the abdomen. Trunsplant tion of the right uriter was mad above the puncture that of the left ureter below the puncture. The patient did well until the tenth day On theeleventh

day his temperature rose and the catheters were re moved The temperature continued intermittently for 3 weeks or more and was accompanied by pain in the right Lidney This finally subsided and the boy was in perfect bealth as far as could be determined Tive months after the operation the child was re ported as being entirely well and attending school

Case 4 A female 39 years of age referred by Dr A F Walter Kresse of Medford Oregon had an incurable vesicovaginal fistula after many operations attempted for relief Bilateral transplantation was carried out on April ro 1928 The bladder was found to consist chiefly of scar tissue urcteral catheters were used. The ureters were thin and dilated to the size of a small finger The left catheter came away on the fifth postoperative day the right began to close on the sixth post operative day After the end of the catheter had been cut off the urine began to flow. The catheter was again cut off on the seventh day On the eighth day I akage began around it The catheter and an inch of dead ureter came away on the tenth day Patient was entirely well 5 months after operation with no inconvenience from the urine in the rectum

CASE 5 A female 54 years of age had a recurrent carcinoma of the bladder following fulguration and radium treatment a year before Bilateral trans plantation of the ureters was carried out on July 3 1928 No 12 catheters were used and both were removed on the twelfth day Recovery was un eventful The patient was entirely comfortable with urine discharging into the rectum Total cystectomy

September 3 1928

CASE 6 A male 28 years of age referred by Dr John G Cheetham of Portland Oregon had an ad vanced carcinoma of the bladder and was in a serious condition Hamoglobin was only 36 per cent and 3 blood transfusions were necessary during the course of the patient's stay in the hospital. The cancer was so far advanced that the case was pronounced as hopeless The hladder had been opened 2 months before to give temporary relief from pain cancer mass was sloughing and was very offensive Bilateral transplantation was carried out on August 3 1928 Both ureters were dilated No 12 urcteral catheters were used and a quarantine drain was placed at the lower angle of the wound. The ureters were blocked on the fifth day The left ureter loosened on the fifth day and the right ureter also was apparently leaking. The left catheter came away easily but the right catheter required some force a small irregular piece of ureter coming away with the catheter Leakage resulted above the transplantation and did not entirely heal Heavy doses of radium were used in the bladder and at present the patient is up and rapidly improving in general health

CAST 7 A male 49 years of age referred by Dr J T Whitty of Scattle Washington bad an ad vanced carcinoma of the bladder which had been removed at one time and treated by fulguration several times On August 4 1928 hifateral trans

plantation of the ureters was carried out and No 12 catheters were used The hladder was found to be filled with a cancerous mass The ureters were large and thick. Along the right ureter were very large metastatic glands both in the pelvis and above the psoas muscle The patient made an uninter rupted recovery and has had radium treatment for the cancer of the bladder although the metastatic glands make the case hopeless as far as cure is con cerned The catheters worked perfectly and came away without force on the sixteenth postoperative day No discomfort results from urine in the rec tum The patient is entirely comfortable and is

gaining rapidly CASE 8 A female 54 years old referred by Dr Charles C Kehl of Scattle Washington had a carcinoma of the bladder which had been treated a number of times with fulguration and finally aban doned as hopeless Bilateral transplantation with the use of No 12 catheters was carried out on August 20 1928 The ureters were thick and some what dilated Extensive involvement of the lymphatic glands along the course of the ureters was noted both in the pelvis and above the psoas I was informed by Dr Kehl that the original growth was principally on the right side Both catheters were removed on the eleventh post operative day as shown by the temperature chart No evidence of infection of any lind was found The patient made an uninterrupted recovery with

little distress

Case 9 A female 33 years of age referred by Dr W E Cass of Vancouver Washington had been given large doses of radium for an advanced cancer of the cervix and bladder. This had been followed by the formation of a vesicovaginal fistula and great distortion of the hladder by scar tissue. The bladder was very painful and had no capacity what soever. Bilateral transplantation of the ureters was carried out oo August 25 1928 No 12 whistle tip urcteral catheters were used. The right ureter was dilated to the size of a man's little finger and the wall was very thin The left ureter was slightly dilated and thick. The patient wis given a blood transfusion of 700 cubic centimeters following the operation On the ninth postoperative day the was relieved by a bulb pointed stylette which was devised by Dr Paul E Spangler and which was made by braising a bulh on a piano wire (Fig 22 C) The left catheter was removed on the eighth post operative day. The right catheter came away of itself on the thirteenth day

The temperature chart of the o cases (I in 24) shows the temperature for 30 days Only r patient (Case 3) had fever after that time

## RÉSUMÉ

The valve principle is a fundamental ne cessity in the transmission of fluid at a given temperature from a chamber of low pressure into one of higher pressure. A true automatic valve must be non motile and vet movable The valves of the heart in the veins at the outlet of the ureter and at the outlet of the hile duct are true automatic valves mu cular development near the outlet of the bile duct and the ureter has no control over the valves. The muscular structure along the wall of the duct and at its outlet probably regulates and accelerates the intermittent flow of bile or urine through the automatic valve and into the receiving viscus The valve automatically closes in order to prevent reflux during the intermission of the delivery of fluid

Intra intestinal pressure varies in relation to intestinal peristalis being reduced in the wake of a peristalite wave. This reduction of pressure facilitates the delivery of fluid through a duct emptying it to this area.

Isolated in tances of accessful transplanta tion of ureter into the large bowel have been reported in the literatur. from time to time since the beginning of modern surgery There is no one way of accounting for these succes es inasmuch as few postmortem exam instions if any have been held on successful ca es. A certain amount of a transel succe followed the Maydl operation improved by Mounthan's modification also the leters operation. In the ecases, the ureter bearing area of the bladder with the valve mechinism was tran planted with the preter 1 review of the literature in the Surgeon (enerals Library in 1010 showed approximately 250 articles dealing with experimental attempts to transplant the preters. In no instance was there scientific evidence to show that success had been attained

The experimentation by Franklin II Var tin was the most important that hid be done. He actually approached and almost solved the problem. He devised a good tech inque but missed the goal of his ambition by failing to differentiate and separate the function of a sphincter from that of a valve Clinically. Fowler had actually mide a vive but failed to recognize it and therefore fulcd to edaborate it because the problem itself had not yet been isolated ind defined.

The problem itself is to deliver fluid from a duct of an organ which works under los pressure into a receptacle where the pressure is higher. This problem was discovered in 1000 when it was found that a bile duct always dilated when transplanted into the duodenum without valve protection wheras such trans planted duct did not dilate when protected by a valve The principles and the technique used in the transplantation of the bile duct were adapted to the transplantation of the ureter into the large intestine with the result that in 1010 5 undamaged dog kidneys and undilated ureters in which transplantation had been done at varying periods of 60 to 167 days prior to removal of the specimens were presented to the surgical section of the Amer ican Medical Association along with a definite Dr Charles Mayo who was technique chairman of the section recognized the importance of the presentation and was the first to adopt the principles and apply them to a human patient The published record of his work set forth in papers dealing with his results on this subject marks a new era in These records show that urological surgery with great regularity and with relatively low mortality when compared with former statis tics he has been successful in transplanting the ureters at separate operations in children with exstrophs of the bladder and further more that the e children grow and develop to maturity in a normal manner with relatively no evidence of late kidney damage. In other word he has definitely proved that in the e patients surviving the operation the mem braneous valve formed by the operation is ample to protect the kidney

ample to protect the kidney. A recent questionance brings the information that not only Lower and myself but many other surgeons have been successful in a similar though smaller way but have not published their suits. The reports also reveal many unpublished distributions results. Tooling the good and bad results the outlook has not been roscate. The necessity of two operations each with a high average, operative mortality has with rure exception limited the field of the neperation to restrophy of the bludder which could be performed only by those surgeons.

major problems standing in the way of general use of the operation after the efficiency of the valve had been demonstrated were

To preserve uninterrupted kidney function while both ureters were being transplant ed at the same operation

2 To minimize infection which had been the cause of nearly all deaths regardless of the type of operation

The closed duct tube technique solved the first problem but infection the chief cause of operative mortality still remained lower segment of the large bowel is segregated it can by irrigation and dry gauze packing be made relatively clean and dry By retro peritoneal drains protected from contact with intestines by a quarantine or rubber tissue practically all danger from sepsis is dispelled and the operation seems to be as free from danger as the average major abdom inal operation Proof is offered in a report of the first o consecutive cases operated upon by the technique herein described two of the operations were for exstrophy of the bladder I for incurable vesicovaginal fistula 6 for advanced carcinoma of the bladder There were no fatalities or near fatalities there was one ureteral leak due to too much force being used when the catheter was removed one ascending infection of right kidney due to accidental puncture of the sigmoid with the sigmoidoscope The patient with the kidney infection finally recovered and became a perfectly healthy boy In all cases renal function has seemingly been undiminished the rectal function in the control of urine has been satisfactory and there has been no evi dence of kidney disturbance after conva lescence

Since the establishment of this technique I have for the first time felt justified in recommending this operation for general use in cancer and maladies other than extrophy of the bladder. I have in past communications expressed the hope that we would at some time perfect a technique which would be safe enough to justify such recommendation. I think we may confidently state that not only the problem but the technique has been solved and that we may now safely recommend the operation to skilled abdominal surgeons whether urologists go necologists or Leneral surgeons in the following cases.

I Incurable carcinoma of the bladder urethra or prostate for palliative purposes

2 Advanced carcinomi of the bladder urethra or prostate in which it is impossible surgically to remove the growth but in which it is possible with the use of large and even ruthless doses of radium to destroy the growth

3 Early curable carcinoma as an essential part of the operation of total exstectomy which may include prostatectomy in the male or hysterectomy in the female

4 Carcinoma involving the urethra

5 Incurable vesicovaginal fistula 6 Contracted bladder due to scars of ul

ceration or to other causes
7 Extensive incurable multiple perineal

fistulæ resulting from various causes

8 Tuberculous ulceration of the bladder in which one kidney remains good the other to be removed

9 Traumatic injuries which make the use of the bladder impracticable

10 Exstrophy of the bladder

To summarize the indications the operation may be considered justifiable in any condition in which it is necessary to dispense with the bladder as a reservoir for urine

Nore -The No 12 whistle tip catheters with Spanil r stylet can be obtained from C R Bard Inc New York

## CRANIAL AND INTRACRANIAL DAMAGE IN THE NEWBORN'S

## AN END RESULT STUDY OF ONE HUNDRED SEVENTEEN CASES BY DONALD MUNRO M.D. FACS BOSTON

RANIAL and intracranial damage in the newborn commonly referred to as intracranial hamorrhage in the new born has been subjected to sporadic investi gation for many years This has included postruortem examinations large numbers of isolated case reports and various recommen dations as to therapeusis. However, a report of a sufficiently large series followed for a long enough time to yield reliable evidence as to the ultimate result of any one method of treatment has never been published Past studies in etiology and diagnosis have also been largely speculative and lacking in the authority that comes from carefully studied clinical material of sufficient mass

This paper pre ents the end results of work carried on for the past 7 years on 117 cases. In addition considerable data has been collected concerning the etiology symptoma tology patholow and treutment. This however must be to envel for future presentation.

TABLE I - LINICAL AND MISCELLANEOUS

DIAGNO ES			
Cl_ ld g s	L g	D d	T i
Trmthem h	34	31	65
Hæmo hg d hæmo hg	3		16
) phyval hæm h g		6	16
C b lood m a t		3 6 7 6	18
9 gralsh L	5	6	
Cblodmat Sgalsh L Ft fkll	5 7 3		7
Frat fll	3	ø	i
B h lpl,	6	1	7
La tùb	1		i
M grm	7		31 7 1 7 1 9
Spljy			í
Nia ma Jr Ci			
o the thing		2	3
Mcll ou dig			-
Hæmrhgad ter mal	6	1	7
Pmtrty		. 3	3
St 1 no n	0	3 2 2	7 3 2 4
Hd phls		2	4
Eplpy dittu pulpt			
St t thymn lymph t c C g tal yph l C ng tal h t d C ng tal d l t tao of col		1	
C g tal yphl		ø	
Cng talh td		1	2
Cng taldlt tio of col		0	
Rick ts			7
Inftdw d			2
Ab of L		0	1 2 1
Adlprf to f gttl us			1

except for certain high spots which help to clarify the material under immediate consideration

### CLASSIFICATION

The cases have been divided into three groups. This was first suggested in a page published by the writer and R. S. Eustis in the American Journal of Diseases of Uniders in October 19.2. Except for certain modifications as to relative importance that plan still proves satisfactory. In addition the older diagnosis—intracranial hemorrhage in the newborn—has had to be expanded to include certuin types of brain and skull injuries in previously covered that may prove fatal or

TABLE II -NUMBER OF PREGNANCY

P	Lng	D 4	T tal
	29	5	54
	8	8	5 <del>4</del> 16
3	6	6	2
à	5	4	9
Š	•	ż	4
Ò	2	3	5
7			3
7		4	5
9			
t			1
12		1	
13			
4		I	
Notg n	I	4	5

TABLE III -SYMPTOMATOLOGY ANALYSIS

	L	D đ	Til
Imp t tymptm			
loo ry	44	44	88
Hype t	5	39	9
C.	35	4	77
C) Wuld t	36	36	
T fat l	3	34	64
Ap th t c		35	57
Momlrptn	15	3	7 64 57 46
Sympt m in t 25	-5		
II dty		18	3
B th phy	8	15	3
It alham hg	7	13	-
I tabl ent l ner yst m	,	ğ	31
No trans	17	ő	~ 6
Ny tagm C l ol m nt	*/	ıί	2
P n		24	
i "d	0		35
	٠,	3 8	9
Dy Cph lbrm tm	*	5	,

## TABLE IV -LUMBAR PUNCTUPE DATA

I TOLL IT DOME			
	L g	D d	Τt
re ure data			
Number of cae punc	-6	••	_
tured \umber of punctures	56	39	95
ma le	99	50	149
Number of measurements	99	30	149
taken	QI	48	39
Highest pressure read	50 mm	48 mm	0,
Lowe t pressure read	r mm	—r mm	
\ erage pressure reading	10 9 mm	II I mm	
erebrospinal fluid data			
Bloody fluid-living 37			
dead 31			
Createst amount	10 c cm	10 c cm	
Smalle t amount	/ c cm	3 c cm	
Verage amount	4 ccm	3 7 € cm	
Number of amounts			
mea ured	٥	2	4
Clear fluid — living 12 dead 1			
( reatest amount	25 c cm		
Smalle t amount	/ c cm		
Werage amount	10 96 c cm		
Numler of amounts	,		
measured	7	0	7
Yellow fluid-living 4	•		•
dead 10			
Greatest amount	17 c cm	4 c cm	
Smallest amount	₫ c cm	/ c cm	
Average amount	6 g c cm	3 75 C Cm	
Number of amounts	-0		
measured Contaminated bloody	18	6	4
fluid-living 16			
dead 4			
Createst amount	3 C Cm	1 5 c cm	
Smallest amount	3 c cm 3 c cm	1 5 c cm	
Average amount	I II C Cm	1 5 c cm	
Number of amounts			
measured	7	I	8
No fluid removed in punc			
tures in	10	4	14
Combined cerebrospinal			
fluid data			
C eatest amount	25 c cm (yellow)	(bloods)	
Smallest amount	₄ c cm (bloody	(bloody)	
	or clear)	(5.004)/	
Average amount	5 542 c cm	2 485 € Cm	

at least disabling. Such cases have no hamor rhage in or about the central nervous system although they are due to the same etiological factors and present the same indications for treatment as does the hamorrhage type.

m ll m t

This grouping of the cases is as follows traumatic asphy and and the systemic blood conditions including hamorrhagic disease of the newborn syphilis etc. In this series as shown in Table 1 there are 83 traumatic 16 asphy and and 16 hemorrhagic disease cases.



Fig 1 A case of traumatic homorrhage and urgical shock. This child a second baby was pale cyanosed and flaced at birth. Nystagmus was present. One lumb puncture was made which gave relief of intracranial hyper tension. Death from ripture of the lateral sinus occurred 37 bours after birth. Ca. e47

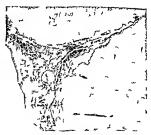
including i syphilitic case. The fractures and acute cerebral cedema cases when not already so diagnosed have been included among the traumatic groups. Certain entries appear twice in the tables. This is due in part to the fact that the hæmorthage in the diathesis series is primarily from a rupture of some cere bral vessel caused either by trauma or as physia which has failed to close normally because of the peculiar changes in the blood as evidenced by prolonged clotting and bleed ing times.

#### DIAGNOSIS

The diagnosis depends in the final unilysis on the demonstration of an increased intracranial pressure. This is true no matter whith the type of case except when the patient is suffering from surgical shock or as it is called in the older publications pallid.



TABLE A — CROSS AUTOPSE ANALYSIS OF INTRACEPANIAL DAMAGE



France of the physician of the physician

asphyra Massive meningeal hemorrha e multiple intracortical humorrhages depressed fracture or cerebral adom all produc a definite measurable increase in intracranial pressure Other symptoms tresu pestive but

TABLE AI -- CROSS AUTOPSA ANALYSIS OF MISCELLANFOUS DAMAGE

## TABLE AII —GROSS AUTOPSA ANALYSIS OF

		Ę	_	д.	_ E
	r 1 1		t rhy	Hæn	~8
Thy mus	- 5	٠	-	74	U
I arge	,	3	0	0	1
Hamorrhage		t	0	0	0
Mediastinum	1				_
Hemorrh ige Pleura	2	1	0	0	0
Hæmorrhage		0	1	0	1
Lung	13	•	•	·	
Rupture	٠,	1	0	0	0
Collap e			0	0	0
Congestion		5	0	1	3
Pneumonia		ō	1	9	0
I rierr hum					
Hemor hage		0	1	0	Ţ
Hea t	4	_			
Hæmorrha e Anomaly		2	٥	٥	0
Stomack	I	I	0	0	,
Acute dilatation		0	1	۰	0
Intestine	3	•	•	۰	۰
Hæmorrhage	3	1	0	۰	٥
Spasm		ò	•	ō	ō
Inomaly		0	0	1	0
Ii r	14				
Hemorrhage		6	0		0
Congestion				٥	3
Large		0	0	0	2
Spl en	6			_	
Congestion Kilney and ur te		4	1	0	1
Humorrhage	3	1	۰	۰	c
Cong stion		ò	ö	٥	ī
Inomaly		ĭ	ŏ	ŏ	ō
1 Irenals	8	_	-		_
Hæmorrl ag		4		1	1
Omentum	1				
_ ll'emorrhage		0	٥	1	0
Pel 1					
Homorri ao Mu-les		1	٥	1	•
II.emorti age			۰	٥	
\scites	1	1	0	0	
Hernia	i	4	٠	٠	٠,
Congenital	•	1	٥	٥	
~ .		_	_		

may be misleading. I hey may be summed up as follows (Tables II and III) on the basis of having been present 40 or more times either alone or in combination a first baby which is hypertonic cythosed refuses to nurse from the breast or bottle has a tense unterior fon tand is apathetic and has some respiratory abnormality may be presumed to be suffering from an intracrantal injury.

## TRI ATMENT

Treatment has been based on three fundamental procedures. No active measures were

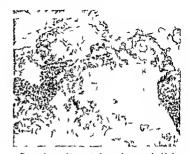
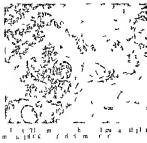


Fig. 4. Vea e of traumitic l'emorrhage in a third beby the thirthe child bad a cephalhematoma of the entre scelp hipp tronus a ten e fontanel and labored respiration ani a vas pale. One lumbur puncture give relief of intra tamal hypertension and resulted in an improvement of the symptoms for 5 lour. At 56 hours there was a sudden recurrence and death, due to a choroid ple in hamortrhage and conget ino—old and new fracture of the skull and rupture of the vein of Galen and the left lateral sinus. Ca. e 55

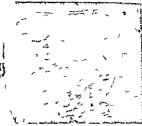
knowingly earned out until the patient had recovered from the surgical shock. In the traumatic and asphysial groups lumbar de compression with a manometer has been per formed is soon after the end of the shock period as possible and continued until the cerebrospinal fluid pressure level has again become fixed at normal. In the hemorrhagic dise ise group parental whole blood has been given intramuscularly in 30 cubic centimeter doses every 3 hours for 4 doses been repeated at the end of another 12 hours as often as might be necessary to bring the bleeding and clotting times to normal after which lumbar decompression has been started Depressed fractures were elevated as soon as possible in every case. In addition the babies were left in the hospital under close observa tion for at least weeks from the day that the eerebrospinal fluid pressure was found to be normal (Table IV) Certain other details which are concerned with the nursing fluid intake handling feeding and the treatment of a secondary scrous meningitic condition which occurs at the end of the second week ean not be discussed at the present time



FATAL CASES

The end re ults in the fatal cises have been obtained in oftr a possible from both a ground microscopic study of postmortem material. The microscopic extamination of the central nervous system has been carried out in every instance by Dr Strahey Cobb but for whose kindly as istrince this work would have been largely impossible. There were 56 primarily fatal cases. Of these 45 came to autopsy. Microscopic studies of the brain were made in 23 cases.

As will be seen from Table V hemor rhage ædema and congestion are the out standing gross central nervous system patho logical entities with hemorrhage appearing 48 Twenty two or almost half of these hymorrhages were subtrachnoid in location Hemorrhage typically appeared in the trau matic class of case (Lig 1) It was conspicu ous by its absence in the asphysial and cere bral cedema classes appearing only once in these Associated with the hymorrhage we find some degree of laceration of the falk and tentorium in 44 instan es (Table VI) The source of the hymorrhage was in the large majority either from the great vein of Galen or from one or both of the lateral sinuses Twenty three of the 31 that could be identi fied occurred in one or the other of these two places The superior sagittal the straight and the petrosal sinuses were all about equally in volved and were very much in the minority



If the cell control to the

Meningitis was found 3 times. The most in teresting of the e cases was one in which the infant lived only 1½ hours after delivery but nevertheless presented an old well organized.

TABLE AM -MICROSCOPIC ANALYSIS OF CERFBRAL DAMAGE

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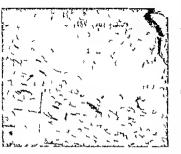


Fig. 7. I case of teaumate hymorrhage and surgal about may be a factor of the high the second day the third way factor day be the second day that second day

TABLE IN —FOLLOW UP OF THE NON FATAL CASES

Ag wh 1 t	N m l D mb	N m l wh l t t d t	L gbtd edD mb	Lot t
er 6 years	2			
to 6 yrs	9			
to 5 yrs	1			
to 5 ) rs	3			i
4 to 4/3rs	î			
3 to 4 yrs	4			l
/ to 3 yrs	2	2	Oceasional onvul on	
to 2 / yrs			IIvdro cepl alic diot	
ɪ/to yrs			I Hyd ocepl a lic epileptic	
ito i jrs	1	4		
6 mo to 1 yr	2	3		
Le than 6 mo				1
Total	25	9	3	10



Fi 8 Sam case as that shown in Ligur 3 sho vin marked perivascular and perineural ordem

meningitis which must have been present a number of weeks. The gross lesions in the rest of the organs have no particular significance except that the liver lungs and adrenals showed the most constant damage (Table VII). Microscopically in the brain we again

TABLE IN A —FOLLOW UP OF CASES FATAL SINCE DISCHARGE

	SINCE DISCI	APGE		
Ag td th	Ca fd th	1 t p y	E t	С
5 > rs 7 mo	Acute encepha litis follo ing tonsillectomy	Yes	Yes	
13r 9 mo	Hydrocephalus and epilepsy	les		1 es
1 ) f 2 mo	Colectomy for Hirschsprungs disease	(Ope a tion)	Yes	
11 months	Spastic idiot erysipelas	No		1 es
6 months	Unknovn	No	?	5
6 months	Congenital heart di ea e	10	1 es	
r month	Unknown	No	3	?
r month	Hydrocephalu a d negl ct	\0		1 es
2 months	Congen tal yph	1 e	Yes	
months	Hydro ephalus	1 es		1 cs
r month	Influenza	10	1 cs	
Total	11		5	4









Igg

ind that conjection hamorphage and ordena lead the lat (Figs. and 3). Again too the hamorphage is most commonly subarachnoid or intraortical with the subpial location a good third (1 thle VIII). The choroid pleaus ilone may also be the seat of prithological changes (Fig. 4 and 5). Among the righty value of the seat of subarase examined showed intracortical congection and hamorphage extending in 2 cares to involve ment of the choroid (Figs. 6-7-8).

#### END PESULTS IN NON FATAL LASES

lifty eight bubies were discharged reheved or improved from the hospital All but 10 of the e have been followed up to December 19, Lleven of the remaining 48 died after is s \ fix | fix | gcd | ftin bo |
Il per I in fix pe a trail tra mat |
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discharge. Five of these 11 deed from known extricational causes at area ringing from 51 years to 1 month all being normal from a cerebral point of view at the time of death (Fig. 9). There were 2 cases in which the cause of death could not be determined 1 dying at 6 and the other at 1 month.

Four infunts died on account of known cere brid disease. In addition there were three infunts who were apparently normal on dicharge from the hospital but who have since dee doped cerebral symptoms. With 2 exceptions all of this type have shown a definite hydrocephalus either at autops, or by en largement of the head with persistently open fontunels. Of the exceptions it is living and normal in every way except that he has been



Ing a A case of traumatue beamorthage strugged shock and memogismus in a first baby. After an excessively difficult delivers the child was pallid and flaccid and not breathing. Twenty four burst let rich child was hypertonic and cya one. The

hours I ter the child was hypertonic and eya otic. The fontanel bulged and there we e generalized convul ons for the property of the control of the control

Fig 14 A case of acute cerebral edema and urgical shock in a first baby After deliv ry the child was pale and flaccid and was not breathing. The pulse count was

having mild generalized convulsions about every 3 months for the past 2 years. These are becoming less severe and have left no de monstrable aftermath. The other was a spastic idiot at 3 months and remained so until he died of crysipelas at 12 months. Of the 5 others 3 lived long enough to show symptoms of either epilepsy or idiocy in addition to the hydrocephalus while 2 living for only 1 and months respectively showed only the under

lying hydrocephalus. It is significant that in every case except the rithit is still living and only hiving convulsions treatment was in idequite. Either no treatment it all was given after birth or that given was improperly carried out or not persisted in for a sufficient length of time the babies being discharged in spite of the presence of symptoms.

Of the 34 patients still living and normal 24 are over ½ years of age at this time (Figs to and 11) This is significant because in this series cerebral disease when it has oc



Fr 14



11, 15

40 At 3/ days the chill was cynnosed and hypertonic with a temperature of 106 degres. He had a shrill weak cry. One lumbar aval of clear colorless cerebro pintle

puncture with the removal of clear colorless cerebro puntl fluid relieved the mild intracranial hypertension. This photo graph was taken when the child was r 'years old. He as! ing and normal at 5 years and rr months. Ca e 153

Fig. 1 case of traumatic homorring in a first bab. On the third lay the child was cyanotic and had convul sions with a left external rectus pal. 1 One ventricular puncture and one lumbar puncture? lie ed the intracranial hypertension a d other symptoms. This photograph was taken then the child was 4 years of age. She was living and normal when 5 years and ir months old. Case 147

curred has been easily demonstrable within the first 2 years and in every instance but I has actually been diagnosed within the first year of life (Figs 12 and 13). The chances therefore favor the normal development of half of the 10 that fall in the groups below If years All three types are represented although as shown in Table I the hemor thingic disease group is in a very small minor ity (Figs 14 and 15).

The most straking of all of the children (not included among the photographs) is now 6 years and 1 month of age. He goes to school and is normal in every way except for a residual sixth nerve pulsy. At birth however this child at one time had an intracranial pressure of 50 millimeters of mercury which was relieved only by removing 90 cubic centimeters of cerebrospinal fluid from his ven tricle. Three lumbar punctures and one ven tricle are the continuous modern approximately 1 o cubic centime.

ters of cerebrospinal fluid were removed. It is obvious that such a degree of acute hydroephalus a this predicates would inevitably lead to a chronic dilatation without some such relief a lass been described.

#### CONCLUSIONS

The end re ults of a series of 117 cases of crainal and intracrainal damage in the new born collected and followed during the past a years are not ented

The dispose of intracrimal bemorthage of the newborn mu t be expanded to include crebral adema and fracture of the skull and hould be stated as crani d and intracrimal lamace in the newborn

Po imortem gross and microscopic studies conducted on 45 of the 56 primarily fat il cases how that meningeal and intracortical h mor rhage congestion and redema are the most common bythological intitie

(ro intracranial humorrhage may occur from the rupture of mo t of the large venous inuses the most common sites bein the great year of Galen or the lateral same Intracortical cedema and congestion alone
may cause death in the newborn

Associated developmental anomalies and cerebral developmental defects were in the one case negligible and in the other absent in this series.

I orty eight of the 58 babies discharged hing and relieved have been followed up to December 1927. Thirty nine of the 48 may be classed as cured 5 are still too your to allow for a satisfactory estimation of the end result.

The most common late result of cerebral damage in the newborn is by drocephalus a so crited with either epilepsy or diocy. Consultions alone and spasticity a sociated with idocs, have also occurred.

Vetive treatment in this series was limited to lumbar decompres ion after recovery from surgical shock. In addition parental blood wa given intramiscularly in the hemortha of disease group. Depressed fractures were elevated as soon as possible. Ventricular puncture was done twice as was a typical subtemporal decompres ion.

# EXPERIMENTAL AND CLINICAL CONTRIBUTION TO THE QUESTION OF THE INNERVATION OF THE VESSILS

B1 RENÉ LERICHE M D AND RENÉ FONTAINE M D STRASBOURG FRANCE F m the S g 1Cl c f th U ty 1St bo g

JITHOUI doubt surgery of the sympathetic system has contrib uted greatly to the study of the anatomy and physiology of the innervation of the vessels Previous to 101, when the senior writer performed the first periarterial sympathectomy our knowledge of this particular subject was confined to the studies of Claude Bernard and the English school as represented by Langley and Gaskell In ac cordance with the classical doctrine of the physiologists Leriche explained the hyperr mia which he found following his operations upon the periarterial sympathetic as a consequence of the section of the centrifugal vasomotor fibers. But the fact that a unila teral sympathectomy often had a bilateral therapeutic result as first seen by one of us (22) very soon aroused the opinion that this theory was erroneous Consequently majority of surgeons who were interested in the surgery of the sympathetic system began to think that the hyperemia following sym pathectomies was more active than passive and due rather to section of the centripetal ascending sensory tibers than to section of the centrifugal descending motor fibers

Since then many surgeons have tried to prove the existence of such sensory vascular fibers and in so doing have employed vistly different procedures Several have undertaken anatomical research reasoning that if by the section of the sensory fibers contained in the adventitia of the femoral artery one can pro duce a hyperemia of the foot one should find in the periarterial sheath long nerve fibers These they have attempted to dissect but so far no one has succeeded in finding such fibers. In spite of numerous recent studies one is forced to conclude that our knowledge of the anatomy of the vascular nerves has not been markedly advanced since the well known work of Potts and Kramer and Todd These writers have shown that with the exception of the thac and axillary arteries which receive direct fibers from the sympathetic trunk the innervation of the vessels is segmentary and comes from the adjacent spinal nerves. Such is also the conclusion derived from the more recent work of Odermatt Wiedhopf Hahn and Hunc.ek and Jetinck.

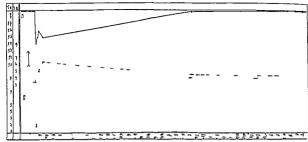
With such segmentary innervation it be comes very difficult to understand the effect of periarterial sympathectomy even though Hirsch who admits segmentary innervation of the vessels shows that the nerves reach them in a direction which is parallel to the axis and that after reaching the adventitia the nerve fibers are distributed especially in the neighboring collaterials. Such being the case a penarterial sympathectomy would denervate the distal segment of the artery and its collaterials rather than the segment upon which the operation has been per formed.

Other writers have studied the innervation of the vessels by the use of physiological experiments and have shown that the vessels are sensitive and that by an intra arterial injection of a 10 per cent solution of barium chloride or a 50 per cent solution of lactic acid one can cause acute pun Pagano and Priedrich and Hellwig think that the pain is produced in the intima of the arteries thim selves but Odermatt and more recently Dumpert and Hick clum that pain is produced only after the injected solution has reached the arterioles and capillaries

In any event after section of the sensory nerves an intra arterial injection of lactic acid still produces pain (Triedrich) and such a section does not interfere with the vascular reflexes (Stewart and Luffer) but after a periarterial sympathectomy the injection become puniles (Hellwin)

We need not dwell longer on these physical experiments which have been an alvzed elsewhere and which were critically reviewed in Odermatt's paper. Here we shall

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limit ourselves to avaing that the great majority of surgeon who have experimentally studical the innervation of the vessels believe that en ore fiber for them really cost Wickhopf and Linglicy alone busing their opinion on contradictory studies on animals done the extreme of such there.

The fact that a unilateral permeterial sympathectomy frequently has a therapeutic effect on both side that the deep ensation is con erved after the section of all cerebro spinal nerve (A. Thoma, and Foerster) and that sympathectomy is successful in many printul syndromes are all proof of the existence of sensory nerves in the vessels. But just as it is true that many physiological and clinical facts cannot be explained by the old vaso motor theory one must allo concede that up to the present no sensory fibers have been anatomically demonstrated. This is why in recent year so many new theories concerning the innervation of the vessels have been ad vanced In view of their anatomical reearch some author still deny the exitence of long sympathetic fibers especially of sensory ones in the arterial adventitia and so they fail to give a satisfactory explanation of the vacular changes which occur after sympathectomy. Other surgeons who base their opinions upon such clinical and physio logical experiments as we have previously mentioned believe that the vessel have sen ory fibers but have nevertheless frequently advanced opinions which have been in direct contradiction to the actual anatomical find

The theory which we offer does not disstree with the anatomy although we can
not at present give the antomical proofs of
our statements. They are based entirely
upon our observations on human bein a
and so avoid the criticism that what may be
true with animals is not necessarily applicable
to man

After sympathectomy whether a part of the trunk is removed or only the pre an glionic or postganglic fibers are cut vascular changes occur which cannot be explained by the classical theory of vasomotor activity. As we have elsewhere discussed the e facts at length (25) we shall only mention them briefly. Besides the chinical findings which we have already mentioned the most important points are as follows.

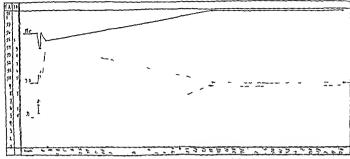


Fig. 2 Right side (intact) Same ca e as that recorded in Figure 1

In man after all operations upon the cervicothoracic sympathetic trunk whether it is entirely removed or only the ablation of the superior or stellate ganglion is performed or only the rams communicantes are cut one observes at the level of the upper extremities after a short period of increase in the arterial tension a marked lowering of the maximum and minimum pressure while the oscillometric index remains increased. In a few weeks the arterial pressure again reaches its original level and the oscillometric index becomes stabilized it its normal figure. Sometimes the postoper tive figures are a little below the pre operative. So one may see that within a few weeks the effect of a sympathectomy upon the blood pressure in the leg affected by the operation disappears entirely

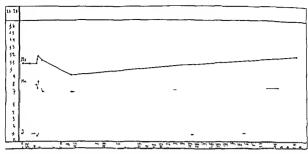
If one is curious enough to examine the blood pressure in both legs at the same time one will find the same vascular changes in both with a parallel and simultaneous evolution. This is shown by the graphs of two crees. The blood pressure was regularly checked for one year and was measured with Dr. Pachons instrument. The first patient. Mr. Rue (Ligs 1 and 2) had the superior part of the cervical trunk down to a point above the stellate graphon removed with a section of the rami communicantes of this graphon. The second patient. Mrs. Mi. (Figs. 3 and 4) who was also operated upon for annual per

toris had undergone a superior and inferior curvical ramisection on the left side. The vascular changes in both cases were biliteral but transitory. One year after the operation the blood pre-sure and the oscillometric index were the same as before operation.

3 The same vascular changes occur in the lower extremities after any operation upon the lumbur sympathetic trunk and these also are biliteral

Frequently following cervical or lumbar sympathectomy modifications in the blood pre sure are found in all four extremities. As proof of this statement we submit 4 graphs (Figs 5 6 7 5) which we obtained from a man 30 years of age upon whom we performed a left lumbar ramisection for reflex disturbances in the left lower extremity. After the opera tion this patient had the typical modifications of the maximum and minimum pressure and the oscillometric index in all four extremities The pre sure in the arteriole measured with Grertner's tonometer showed the same changes everywhere. I we weeks later all of these variations were found to have returned to the pre operative rate

5 Territerial sympathectomy frequently produces all of the signs of an active visco dilatation not only on the side operated upon but on both sides and often in all four extremities. Within a few weeks the circulation ag un becomes normal



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arms by the last ry method a detection to define the definition of the last row of the last row method and the loom to definition of the part of the

6 The resection of an obliterated arterial sympathectomy produce a vasodilatation with active local hyperamia and hyper leucocytosis This to returns more or less rapidly to normal

7 In certain cases namely Buerger's disease in which one finds an obliterated venous trunk the resection of this trunk also produces a temporary hyperæmia

All of these facts cannot be explained by the classical theory of asomotor acts ity but they can be readily understood if one advances the hypothesis of sensory tibers in the essels

On the contrary there are now certain other facts which seem to indicate that sympathectomy does really destroy motor fibers. The most important is the following. We know that Claude Bernard found that in animals the removal of the superior cervical ganglion produced a marked hyperemia in the corresponding foreleg which persisted over a period of 18 months following operation. In human beings we have observed the same phenomenon after operations upon the cervical and more often upon the lumbar sympathetic. We found in these cases more

than 1 or 2 years after operation a pensistent elevation of the local temperature of the in volved limb. The increase was r 2 4 and in one case 7 degrees C and at the time of the last examination when these figures were recorded all other vascular changes due to the sympathectomy had disappeared.

The pitient whose graphs are shown in Figures 5 to 8 represents a typical case. Six weeks after a left lumbar ramisection the maximum and minimum pressure the oscil lometric index and the pressure in the arterioles had returned to the pre-operative rate in all four extremities but the left lower extremity still showed an increase of de rees C. in its local temperature. Four months letter this hyperermia still persisted.

Adson Brown and Rowntree and Allen at the Mavo Chme have made smular observa tions following lumbar ganglionectome. These apparently indicate a vasomotor paralysis caused by the operation and this would be completely in accord with the classical theory of vasomotor activity.

If one carefully observes the vascular changes following sympathectomies one con cludes that some results indicate that while

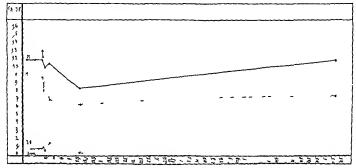


Fig 4 Right side (intact) Same case as that recorded in Figure 3

the operation has only a very transitory in fluence upon the circulation other modifications are deeper and more persistent. This again brings up the question as to whether or not sympathectomy really produces a vaso motor parallysis

We shall answer this by a study of the vascular reflexes. Our observations have been made on patients whom we have seen for recent or old traumatic nerve sections or upon whom we have performed therapeutic neurotomies. The section of the nerves in all of the patients was verified at the time of operation.

The best way to ascertain whether or not the section of the so called vasomotor nerves produces a paralysis is to see if the blood vessels in the denervated area respond to excitations which normally produce either a contraction or dilatation of the arterial wall Cold should instantaneously produce a marked vasoconstriction and heat a vasodila tation If by sympathectomy one really in terrupts the vasoconstructors the vessels should not be able to contract On the other hand if the spinal nerves really contain the vasodilatators heat should no longer produce an increase of the blood supply when these nerves are cut. In other words in either case the vessels should no longer be able to adapt themselves to external heat and cold

We have studied these reactions by in scribing the oscillations obtained with Dr Pachon's instrument upon a kymograph First we took the normal curve then for rominutes the himb was put alternately in water at 40 degrees and 11 o degrees C After each bith a new curve was taken and by comparing the results we were able to judge the reactions to external heat and cold. The tollowing cases were examined.

1 Six patients had at some time undergone sym

CASE 1 Mrs L had had the left stellate ganghon removed for bronchial asthma 1/2 years before CASE 2 Mr B had had the left stellate ganghon

removed for bronchial asthma 18 days befor (Figs o to 14)

CASE 3 Mrs S had been operated upon o months before She had had an inferior cervical ramusection performed for reflex disturbances in the upper extremity (Fig. 15)

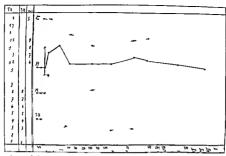
CASE 4 Mrs T had had a bilateral inferior

sympathectomy for scleroderma performed 1/
years before

CASE 5 Mr K had had a left lumbar ramisection done for retlex disturbances in the left lower extremity

CASE 6 Mr F had had an inferior cervical ramisection for Raynaud's di ease a few days before

II Fire patients had suffered trainmatic sections of the spinal nerves. In several cases the trauma was old in the others more recent. These sections were ventified by operation and two of these patients have also had sympathectomies performed.



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CAT S month ago M N halr tda gunshot vo dvl h lvd the m dan n r Complt ctt

CAR M I had had a complete on of the radal verther the dofth fram 4 month b fo

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CASE 4 M Z had had a complete section of the scata n vc1 9 6 aprart all sympath ctomy had b np rf m d2 v b fore and a lumbar r m ect on 3 month buf e vami tion

CASE 5 M F had had a part alsett of the b had I u (the hith and is the real rots) h h p odu ed a compile to pradjass ith mued to of the ham and shalld but con with m tion of the fing. This ajury wis read an utom bil condent j months b for examm tion.

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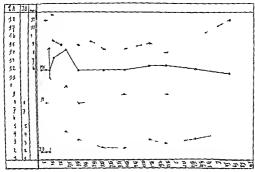
CASP I Mr ( had hid a comple traumatic
section of the spinl cord at th level i th ghth
dors l vertebra Th has been verifid by 1 min c
t my The accudent dated back 4 months Two

months later a perif moral sympathectomy had b en perform d on the right side

Case 2 Mr H had a spasmodic quadriplegia afte the fracture of several cervical vertebræ 5 months b f re Laminectomy had b en performed

CASI 3 Mr S had had a spinal cord syndrome of unknown org n accompanied by marked vaso motor cha g s and a spontaneous right sid d Claude Be and Horner synd ome which could not be explain d by the compression of the cer real sympathetic and seemed to be of medullary org n

In all of these 14 patients the reactions to heat and cold were normal. The cold bath always produced a marked reduction in the amplitude of the oscillations which in hot water rapidly became normal and then in creased in size. There may have been some difference in the intensity of the reactions depending, upon the individual patient but we found the same variations in a series of normal persons whom we examined in order to establish a control. This may be explained by the fact that all of our patients were not of the same age and as is well known older per ons



Lig 6 Fight upper extremity Same case as that recorded in Figure 5

naveless extensible vessels than vounger ones We also know that the intensity of all nervous eactions varies greatly depending entirely upon the individual

In any event there is no doubt that all of hese patients who following the classical heory could be considered as suffering from asomotor paralysis reacted normally to

he hot and cold water buths

From these observations one would conclude that the complete section of the lower ions is spinal cord the compression of this organ the complete removal of the cervice thoracic sympathetic the section of the limbur rum communicantes the section of important nerve trunks for example the median radial or sciatic nerves or the roots of the brachial plexus will not prevent the vessels from reacting normally to adequate excitations. They still contract under the influence of peripheral cold and dilate on the application of external heat

We should like to emphasize this point by utilizing the example furnished by the patient who had a complete section of the scritte nerve which had produced troplic complications. He was successfully submitted to a perifemoral sympathectomy and later to a lumbar ramisection. The last lumbar ganglion was also removed. One would conclude that this pittent would have as nearly as possible a

complete interruption of the visomotor fibers. Nevertheless his reactions to heat and cold remained normal on the side affected by the operation.

In summary we may say that

I After section of the so called vasomotor nerves the blood vessels are not paralyzed They are still able to contract and dilate upon the external application of heat and cold

2 The reflexes which affect the circulatory changes associated with the external temperature must be considered independent of the spinal cord and of the centers of the spinal cord and of the centers of the spinal term. The fact that these reactions remain normal even though the section of the spinal nerves dates back far enough for degeneration of the peripheral ends to occur proves that there can be no question of any axone reflex.

For this reason we are once more obliged to stress the great importance of the visomotor to the peripheral intrumural centers which we believe are contained in the arterial wall itself. It seems to us that the viscular changes following the external application of hert and cold illustrate the simplest type of viscular reflex and require only the integrity of the intramural centers. It is however a true reflex because it needs a sensor element capable of appreciating the variations of the temperature and a motor element which



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controls the ontra tion or dilatition of the

We do not believe that all vascular reflexes have such a short path. I his can be demon strated by the study of viscular changes following the application of mustard oil as done by Bru e Breslauer and Fischer In experiments upon a cat Breslauer and Bruce have observed that in inflammatory redness can be produced with mustard oil even after complete section of the spinal cord if the ection is not of too long standing We have found the same to be true in humans for instance a patient who had a spinal cord section at the level of the eighth dorsal seg ment gave a positive reaction in the an æsthetized region of the lower limbs 10 months after the section but the reaction was less marked than on the intact upper extremities

Bruce and Breshuer all of observed that following section of a nerve trunk the mustard oil test remained positive as long as the peripheral nerve endings had not entirely

degenerated The reaction does not occur in the anisthetized region years after the section

Truncular anæsthesia does not prevent the reaction but the local infiltration of novocain abolishes it entirely (Breslauer)

Our patient who had had a section of the scratic nerve in 1716 had a negative mustard oil test but on the other hand our patients who had undergone sympathectomies all showed normal reactions. So we agree with Bruce and Bre lauer that the mustard oil test is based upon an axone reflex and as such requires at least partial integrity of the peripheral part of a sensory nerve.

This shows that all vascular reflexes do not travel the same path. The way may be simple or it may be more complicated. The reaction to hert and cold is an example of the very short reflex while the visionotic change produced by mustard oil enter into the group of axone ruflexes. We can therefore divide the vascular reflexes into the following groups.

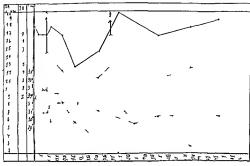


Fig 8 Pi ht leg Same ca e as that r cord d in Tieure 5

- r Peripheral vascular reflexes having their center in the intramural plexuses
- 2 Vascular changes through a one reflexes
  3 Intrass mpathetic reflexes which have
- their center in the ganglin of the sympathetic trunk
  - 4 Medullary vascular reflexes 5 Cerebral vascular reflexes

If there are long vascular reflexes it seems to us that no doubt remains that the motor innervation of the vessels comes from intra mural centers which correspond to the similar centers in the gut and the heart

Besides these peripheral centers there is a rich extrinsic nervous system consisting of association fibers only which makes it possible for the vascular changes in one part to be in harmony with the blood supply of the whole body. This extrinsic nervous system which is composed of excitor and inhibitory there plays a most important role but it should never be thought to consist of centra fugal fibers partly vasoconstrictor and partly visionly truther. To demonstrate its action we cite the following observations.

In patients with in old section of the sciatic nerve we often observed that the leg suddenly became very much reddened and very with the litter for upparently no reason it became very cold. We found that the local temperature was lower than that of the other

limb During both periods normal vascular changes could be obtained with hot and cold water. We now believe that these very rapid and spontaneous changes from extreme vaso dilatation to extreme vasconstriction, which occurred for no apparent reason when the patient was in bed indicate that after the section of the sciatic nerve, which contains the association fibers for the lower limb, the exessels lose the ability to regulate their own circulation in harmony with that of the rest of the body.

Such being the case we must admit that every assomotor reaction regularly produces two kinds of vascular changes (1) changes in the local circulation of the region affected by the operation through short reflexes and (2) changes in the general circulation through lon, reflexes

A very simple experiment demonstrates this point. If one dips one's hand in hot water the skin becomes red in a few minutes. The color of the skin on the other side does not change but on examination with the oscillom eter we find increased oscillations on both sides. So if one considers only the effect upon the blood pressure one would say that the vascular changes are bilateral. However, if one notices only the change in color one would say that the effect was strictly unilateral and limited to the area where heat was applied.







Left d ft hot I ti

Actually the immersion in hot and cold vater produce two kinds of viscular changes hat i local variation through short reflexes ind general changes by long distance releve only the last having a bilateral effect By measuring the blood pressure we obtain he effect of the long reflexes only the modifi ations in the local circulation are more inflicult to a certain and we generally ee heir effect only in the form of increased local nea t

Under certain conditions e pecially where he excitation are slight the influence upon he general circulition may be so small as to be tearly absent but generally speaking the effect of peripheral excitation upon the circulation can be found Lately in collaborat ng with Dr Milojewitch we have observed this in peripheral traumats of the limbs which instantly produce changes in the local and general circulation

Therefore if one always considers in all asomotor reactions the double effect upon the local and the general circulation it be come easy to under tand the apparent dis ord which exists after sympathectomic where one finds on one side a transitory but generalized effect upon the maximum and minimum pressure the oscillometric index and the arteriolar pres ure and on the other side a strictly localized hyperamia which i very persistent

The modifications in the general pres ure are the result of long distance reflexes pro duced by the operative trauma the hyper amia is the consequence of the suppre sion of a certain number of association fiber with pressor effect. This uppression gives the artenole capillary system a certain degree of autonomy lowers the arteriole capillary to nus and produces a peripheral vasodilatation However the vessels are not paralyzed and the vasomotor phenomena produced are active and not passive

In other words every sympathectomy produces (1) changes in the general circula tion through long reflexes which are produced by the operative trauma of the nerves of the ve sel () modifications in the local cir culation of the limb operated upon which are the con equence of the suppression of the association fibers with pressor effect

Therefore the changes which occur after sympathectomy hould be expluined as fol lows

I After a persarterial sympathectomy the contraction of the arternal segment operated upon is the result of a direct trauma of the



Fig 12 Right side (intact) Normal curve



I ig 13 I 1 ht side after cold bath



Fig 14 Right side after hot bath



Ii 15 Mr S Section of the communicating rams of the left stellate gangl on had been performed 1/ years before The curve was determined under a constant pressure of 9 centimeters of mercury. The left fo ea m was alternately submerged in cold and hot water. The reactions vere also normal in this case.

intramural peripheral centers. This contraction lasts only a few hours. The visodilatation which follows is produced by long reflexes. For this reason it may be bilateral and even produce modifications in the maximum and minimum pressure and the oscillatory index in all four extremities.

The periarterial sympathectomy changes the circulation in the extremity operated upon and this simultaneously produces an increase in the local heat

These local changes are less marked after penarterial sympathectomy than after sympathectomy upon the trunk the reason being that a perarterial sympathectomy does not interrupt so many pressor fibers. The hyperama is therefore less marked and less persistent than after operations upon the sympathetic trunk.

3 After operations upon the sympathetic trunk the same vascular changes occur as those after penarteral sympathectomy but since the arterial wall is not directly injured the initial contraction does not occur

### CONCLUSIONS

The motor innervation of the vessels is due to peripheral nerve plexuses in the arterial wall itself

2 The extrinsic nerves of the vessels play the role of association fibers with pressor or depressor effect

3 The simplest viscular reflex has the peripheral plexuses as a center and the reaction to heat and cold is a reflex of this kind

4 There are more complicated viscular reflexes (a) the axone reflex (as demonstrated by the mustard oil test) (b) intrasvm puthetic) (c) spinal cord and (d) cerebral visomotor reflexes

5 Lvery visomotor reaction should be considered from two standpoints namely its influence upon (a) the general circulation and (b) the local circulation of the limb operated upon

6 In the particular case of sympathectomy this double effect must be taken into con sideration. The modifications in the blood pressure are common to all four extremities



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Fig 12 Right side (intact) Normal curve



Fig. 13 Ri ht side after cold bath



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6 In the particular case of sympathectomy this double effect must be taken into consideration. The modifications in the blood pressure are common to all four extremities and therefore symmetrical. They are trunsi tory and due to long distance reflexes pro luced by the operative trauma of the va cular nerve. The local change are more persistent but trictly confined to the side operated inon they may be explained by the suppre som of certain fibers with pressor effect

I he viscular changes are the same after b th perinteral sympathertomy and opera tion upon the sympathetic trunk but in the latter on eathe modifications in the local cirulation are more marked as more pre or tibers have been out. There is a quantitative but not a qualitative difference between these two operations

S Our theory of the vasomotor activity not centradicted by anatomical factor Ly n if the segmentary innervation of the ve all be true one can understand that a periarteral sympathectomy although it may be my le it a level far distant from the lesion mis through long reflexe produce general changes in the circulation and lower the irteriole capillary tonus by the appre sion of some pre or nber thu producing an in crused local heat! The fact that the hyper imit after periarterial sympathectomy is less perat nt than after sympathectom apon the trunk only demon trate that with the latter more pre or fib is are cut

Such are our of cryations and conclusion on ampathectomics performed upon hu m in Our theory has not yet the anatomical confirmation that intramural centers do exit in the artered wall for to date they have been tound in only a ten ve a We hope that we hall ame day be able to prove their exi ten e

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## LEIOMYOMATA OF THE INTESTINES1

BY JOHN A WOLFER M.D. FACS Chicken fSgyN thw 1 U A oc 1 P f ty VI d ts hool

MOOTH muscle tumors of the intes tines occur frequently enough to be considered in the differential diagnosis of intra abdominal tumors and in establishing a possible causative factor for certain intes tinal complaints including intestinal obstruc tion. The frequency of a mistaken diagnosis warrants reporting a case in detail and calling attention to the clinical and pathological aspect of this type of neoplasm

### CASE PEIORT

Mr I S Polish 44 years old was admitted to Wesley Memorial Hospital on June 6 19 7 His wife and 5 children were living and well. His only complaint was of a large painful mass in the upper right abdomen which he had first noticed about 6 months previously. I ain had first been felt in this region about to months previously. At that time it was neither severe nor constant, but it gradually grew worse and became practically constant. There was no food relation to the pain and the patient had been able to est anything. His appetite had re mained good until shortly before coming to the clinic. There was no nausea or vomiting. He had no dyspacea no cough or chest pains and no Ire quency of urination and there was no association of the pun with urinition He had hid occasional headaches but no vertigo He slept well During the past months before entering the clime he had had 3 or 4 vatery stool daily. He had lost 35 pounds in weight during the past ro months. His ast and family history gave no additional informa tion and he denied any venerual infection

An examination revealed a rather poorly nourished mak with pale skin and thin gray hair. There was no discharge from the ears. The pupils reacted to hght and accommodation. The tongue was furred and the teeth were in poor condition. The supra clavicular fossæ were sunken and the chest was thin but the lungs were essentially normal as to physical findings The heart was normal The skin of the abdominal wall was atrophic and the muscles were relaxed An ovoid mass could be palpated in the right side. It extended from the costal margin down to the crest of the ilium and from the median line well to the right flank. It was smooth firm freely movable and not especially tender. When the pa tient lay on his left side the tumor would shift well to the left side of the abdomen it descended with inspiration and seemed to swing from the gall blad der site. The lower edge of the liver could be pal pated on deep inspiration and lay anterior to the tumor The spleen was not palpable but it was thought that the right kidney could be felt behind the mass. The prostate felt normal in size. All re flexes were normal. In the left buttock was found a soft well defined mass about the size of a lemon This was freely movable and thought to be a lipoma

The stools were semi solid brown and well di gested The benzidine test for blood was strongly po itive and there was present an occasional pus cell but no mucus The blood Wassermann was negative. The urine had a specific gravity of roso was amber in color and turbid with a faint trace of albumin and no casts. There were 75 white cells per & field At other times double plus albumin with hyaline and granular casts was found. The blood count showed hamoglobin 70 per cent. red blood cells 4 760 000 leucocytes 11 300 polymorphonu clears 86 per cent lympho ytes 12 per cent large mononuckars per cent A cystoscopic examination showed a normal bladder mucosa with slight en largement of the median lobe of the pro tate. The urcteral orifices were normal and clear urine could be seen spurting from each. The ureteral catheters passed easily phthalem appearing from the left

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h patic flexure seemed to be pushed to the left addo nwn d (fig. 3). Sum  $n_1 \vee n_2 \vee n_3 \vee n_3 \vee n_4 \vee n_4$ 

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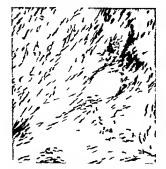
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1: ( Y low po er photomicro raph showing typical m otl mu cl cells

bladder was made although we questioned the possibility of a gall bladder shadow if the viscus overlay the tumor due to the opacity of the tumor

Op rition On July 7 the abdomen was opened through a right paramedian inci ion Whin the peritoneal cavity was opened a large tumor masseme into view. This mass lay behind the ascending colon and pushed the hepatic flexur, to the left and downward. The lower edge of the right lobe of the liver projected over the upper part of the tumor. The gail hladder was free and moderately filled with bile and lay over the tumor. The tumor mass felt.





Ing Ah shipo erphotomicro aphislowing the typical cigar shiped nuclei of smooth mulcle cells

smooth except for a knob which could be seen projecting from the median lower surface of the tumor to the left of the ascending colon. The parietal pentoneum which was riflected from the external surface of the ascending colon was split and the mass rither easily enucleated from behind the colon via rea of the anterior surface of the tumor about 8 centimeters long and 2 centimeters wide was closely diherent to the posterior surface of the colon. It



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## THE TUMOR

The tumor weighed approximately 1050 grams. It measured 13 centimeters in its wide t diameter and was ovoid in contour One knob about a centimeters in diameter and centimeters in height projected from what had been the antenor inferior surface (Fi 4) The surface of the tumor was smooth with here and there ta, of connective to see Mam fur sized veins lav in the cap ule The color varied from grave h white to pink white with areas of brownish di coloration. The ma was of a firm const tency and offered con siderable resistance to cutting. The cut sur face varied in color from gray to pinkish white Areas measuring as much as a centimeters in diameter were brown in color and represented old hemorrhage with digeneration (Fig. 5)

Many whorls of neoplastic growth as in uterine myomata could be seen Lying between the main tumor mass and the resected gut were two small nodes one about 3 by centimeters and another somewhat smaller The cut sec tion of these nodes was very pale. The entire mass was intimately attached to the gut wall over an area about 5 centimeters in length and 2 centimeters in breadth

Sections from the tumor showed typical smooth muscle cells with characteristic cigar shaped nuclei (Figs 6 7) The same type of cells was found in the several small nodes al ready described. In selected areas the body of the muscle cells seemed atrophic but as a rule the nuclei retained their morphological characteristics. In some areas thin walled blood vessels were few while in other regions they were quite numerous (Fig. 8) through the areas of discoloration indicated degeneration of the muscle fibers. There was present in the white firm areas a large amount of connective tissues with hyalinization (Lde ma was present in various parts of the tumor A large section cut through the area of attach ment of the tumor to the gut wall failed to indicate definitely that the tumor took its origin from the museulature of the gut wall although there was a close association between them (Fig o)

This was therefore a leiomyoma growing

from the ascending colon

Throughout the literature occasional refer ences are found to myomata of the gastro intestinal tract. In 1898 Steiner gave a de tailed description of this tumor and reported from the literature 58 cases of myoma of the gastro intestinal tract 23 growing from the stomach and 35 from the gut including 3 new cases The earliest reference was made by Boethave in 1728 who mentioned poeses Genaeches der Heisch chichte des Darmes Probably the first authentic de scription was by Foerster in 1858 who de scribed the Tibroid of the Muscularis of the Tleum

#### PATHOGENESIS

Needless to say no definite etiological factor can be vouched for Steiner mentioned the frequency of small circumscribed myomata or

polyps near areas of diffuse hypertrophy of the stomach and gut musculature the tumors being the result of irritation. This followed the theory of Virchow Winkle went one step further and stated that he believed the tumor to be the result of disturbance in circulation due to trauma or inflammation with possible changes in the ves el walls due to syphilis or chemical changes in the blood such as caused by parasites Gottschalk found among the muscle cells in very small myomata chromat in rich nuclei. He believed these to be nuclei of musele cells or nuclei of cells of the lymph ves els or must cells and attributed great im portance to them Since they are not found in larger tumors he believed that they must play a decisive role in the etiology of the tumor

The immediate site of origin of the tumor must be in a muscle structure of the gut wall either of the muscle coats or the muscularis mucosa (Foerster Virchow Boettcher Bro dowski Wesener) klebs and Roesger be heved that the tumor grew from the muscle of the vessel walls Lubarsch also concurred in this as he had seen mall my omata intimately associated with blood vessels

According to Virchow the tumor begins its growth in a muscle stratum just as a neuroma grows in a nerve. As it increases in size it pushes adjacent tissues aside and extends either inward into the lumen of the gut or outward into the pentoneal cavity or extra peritoneal space. When the growth finds its origin in the longitudinal muscle it becomes an external growth but when it grows from the circular layer it becomes an internal growth

If one may reason logically it would appear that a small tumor which had its origin in the longitudinal muscle as a result of the resist ance of the constantly contracting circular muscle would progress externally (Figs. 10) 11) but that when its seat of origin is in the circular layer its growth most likely would be toward the lumen and would be sessile in type When the origin is in the muscularis mucosa as a result of the constant traction of intes tinal peristalsis a typical pedunculated in ternal tumor would develop (Fig. 12)

The malignant changes in myomata es pecially in those cases in which metastasis occurs have constituted a topic of contro

Zeit believes that true malignant changes may take place but that benign met istases do occur in the form of emboli of tumor cells which may be carried to the liver Here they are ordinarily destroyed but the cell may remain viable or may even grow and produce secondary but benign growths (shon and Hintz reported a case in which the primary tumor was in the ileum and caused intussu ception There were secondary nod ules in the abdominal wall lungs chest wall pancreas both suprarenals in the capsule of both kidneys muco a of the stomach so in the mall inte times and a thrombus of tumor cells in the seventh intercostal vein colon prostate and large lymph gland groups vere free \ number of other cases have been reported. There seems to be no question but that smooth muscle cells may take on an atypical growth the resultant tumor being sarcomatous in nature and that metastases can and do take place (Lan_erhans Hanseman Minkowski)

Since leading and their classical prototype in uterine myomata, the latter having been studied in lurge groups, little crib be added to the pathological picture of the tumor itself. Neverthele, in intestinal myomata, the clinical picture lends its lf to a classification which is of both pathological and clinical importance, viz. the external type which appear as an abdominal tumor and gives symptoms of being, an abdominal tumor the internal type which produces a variety of irm tative intestinal a simptoms often culmination in obstruction, and the rectal type which due to its location and characteristics, is usually mistaken for a currenome.

#### EXTERNAL MYONA

It is assumed that the external my oma finds its origin in the longitudinal layer of the gut musculature. The growth is outward and the leaves of the mesentery are spread or the leaves of the mesentery are spread or the kine of the common spread of the kine of the common surface of the cutta intestinal to sue. The common surface has though which most of their blood supply is determed. According to the age and rapidity of growth of the tumor the size may vary

from that of a cherry to that of a mass filling the entire bidomen. In Woelfler ca e the tumor weighed 7 kilograms. It seems that the larger the attachment of the tumor to the gut wall the more likely is rapid and pro ressive growth. Adhesions are not uncommon but never to the extent that the tumor becomes fixed. As a rule the mass is freely movable until it reaches the size where due to bony or solid visceral provinty mobility is prevented. The mixed variety may encroach upon the lumen of the bowel and produce partial or complete obstruction. Adjacent orguns are often compromised and pressure atrophy of the liver and pancreas may result

The outstanding sign is the presence of a tumor which has rather free mobility is fre quently nodular and not especially tender The growth is comparatively slow at times extending over a period of many years. For example Kukula reported a case in a male 71 years of age in whom the growth had been felt for 20 years first as a nodule the size of a hazel nut later the size of a fist and finally as large as a child's head. When the growth takes place in the wall of the small gut dis turbances in intestinal flow are more common than when the tumor is situated in the colon This is due to the formation of traction diver ticula and adhesions with angulation or pres sure When partial obstruction occurs cramps comiting and obstipation are common and intermittent as a rule Parely is the obstruc tion complete Strangulation or incarceration of the tumor is possible as in Lukula's case in which part of the tumor was incircerated in a hernial sac Sooner or later due to changes in the mucosa inflammators or ul cerative in nature bloody or mucous diar rhoea may alternate with constinution In my case in spite of a large tumor there were no obstructive symptoms at any time but for several months before the patient reported at the clinic he had had from 3 to 4 waters stools each day and an evamination of the feces in the clinic revealed the presence of blood and pus cells Steiner reported a case of fatal hemorrhage

The outstanding diagnostic points can be briefly summarized as follows an intra ab dominal slowly growing often nodular freely movable not especially tender tumor which is not connected with the genital tract the manipulation of which produces a drawing pain and which eventually causes disturb ances in the passage of intestinal contents and hemorrhage. To this can be added the evidence obtained by means of the X-ray with contrast media in the gastro intestinal urinary and biliary tracts.

### INTERNAL MYOMA

An internal myoma most likely grows from the muscularis mucosa but rarely attains the size of the external variety because of the early encroachment upon the lumen of the gut and resultant intestinal obstruction. It is most frequently pedunculated and the pedicle often attains a considerable length mucosa over the tumor may remain intact especially when the tumor is still small Eventually erosions and ulcerations result Inflammation of the surrounding mucosa fol lows and accounts for the symptoms fre quently observed In cases of deep ulcer ation rather brisk hemorrhages may occur The pedicle may atrophy and eventually cut through thus isolating the tumor in the intes tinal lumen The tumor may then be spon taneously passed per rectum. In Pellizari s case a girl presented a fair sized tumor in the ileocateal region which was thought to be an ovarian cost. She began having severe abdominal cramps vomiting obstipation and fever Finally symptoms of ileus appeared Suddenly the patient passed the tumor which weighed 500 grams per rectum Prompt re covery ensued

It is possible for a small tumor to be present for a long period of time without producing any symptoms but with increase in size or ulceration symptoms make their uppearance. Diarrhea alternating with constipation muous in the stools bleeding of all degrees from occult blood to exanguinating harmorrhage may occur. With partial obstruction there follow cramps vomiting obstipation with varying degrees of distention. Often these symptoms very suddeily disappear and coin cident with the relief, the patient passes large quantities of foul bloody muous stools. Not a few of these patients sooner or later develop

an intussusception with its classical picture but varied by frequent sudden and spon taneous relief and then recurrence. In the presence of a fair sized tumor or an intussus ception a mass may be felt in the abdomen. This mass has a tendency to vary in size the decrease being synchronous with symptomatic relief. Obstructive symptoms may occur over a long period of time as in Heurieaux's case in which the patient suffered attacks for over 10 years and then the lime covered tumor appeared in the rectum.

Stemer tabulated the symptoms as follows (1) the frequent sudden appearance of a tumor in the lower abdomen (2) a tumor in the abdomen which grows slowly for months or years (3) the sudden increase or decrease in the size of the tumor signifying regression or progression of the invagination (4) with the increase in the size of the tumor the appearance of intestinal stasis (5) coincident with the decrease in size of the tumor disappearance of the symptoms with the passage of foul faces (6) complete relief of symptoms after a severe attack of intestinal obstruction the

These diagnostic points are as reliable and complete today as they were 30 years ago and little can be added except perhaps the evidence obtained by the newer laboratory methods such as gastro intestinal X ray with contrast media py elography or cholecystog raphy

#### RECTAL MYOMA

Rectal myomata may be either internal or external The internal type is usually in the form of rectal polyps. While the polyp is small it may cause few if any symptoms but as it increases in size constipation may al ternate with blood stained loose stools. With ulceration mucus blood and pus may be present in the faces. The patient often complains of the sense of a foreign body in the rectum and struning at stool may extrude the pedunculated mass through the sphincter As the tumor increases in size more obstructive symptoms appear leading to subtotal or complete obstruction Coincident with the varying degrees of obstruction colic nausea and vomiting occur Digital or instrumental

examination will reveal the presence and character of the tumor

The external type presents a perplexing and confusing picture. These tumors usually grow from the posterior wall of the rectum and after a time till the hollow of the sacrum The progress of growth in this direction is then arre ted but the growth then proceeds up ward and laterally and pushes the rectum anteriorly toward the bladder. The mucosa is stretched over the mass oftening resistance to the onflow of freil contents. Ulceration and necrosis may then take place and result in mucous and bloods stools. Constipation alternates with foul bloody diarrhaa tumors may att un an enormous size. Senn reported a ca e in a female 45 year of age whose peritoneal cavity was filled with fluid After the fluid had been aspirated a large solid tumor not attached to the uteru was felt in the left lower abdomen At Laparotomy a myoma weighing 12 pounds was removed It lay behind the peritoneum and took its origin from the posterior rectal wall

In the well advanced cases ob tructive symptoms with bleeding and foul stools are the outstanding symptoms. These patients often develop a mirasmus or cachevir not unlike that due to malignancy and with the inding of a large ulcerating tixed mass a diagnosis of inoperable carcinoma or arcoma is made. The long history should suggest the presence of a myoma and a microscopic examination should estiblish the diagnosis.

#### THE STMENT

Since leiomyomata are bengn tumors a thorough local removal should lead to a cure in the external type due to the rather broad base it may be necessary to resect the portion of the gut from which the tumor takes its origin. In my case it was comparatively easy to enucleate the tumor but it seemed unwise to resect only the area of attachment for fear of stenosis of the gut. When the tumor is not large or when the base is small it is quite possible to resect the attachment and close the defect in the gut wall by suture. The internal variety must be treated according to the location and the nature of the complicating pathology. Since practically every tumor imparatively supposed to the properties of the complication of

has a pedicle the bowel may be incised and the pedicle removed by a wedge shaped excision even ligation with earliery may be sufficient. In the presence of intussusception, the type of operation will depend upon the viability of the gut and the condition of the patient.

Rectal myomata offer the most technical difficulties Small peduneulated polyps can be removed with a snare and the stumps cautenzed The large external type are ex ceedingly difficult to remove Several an proacties are available viz the abdominal route when the tumor is very large and he high with the base of the tumor acces ible from within the abdomen When the tumor is very large and fills the pelvis it may be next to impossible to gain entrance to the pelvis and enucleation may lead to profuse bleeding which further complicates the operation Berg used a modified Kraske technique with suc cess. The method employed by Senn has much to be recommended. He ligated the rather broad pedicle in three parts and re moved the tumor then excised the ba e and sutured the defect in the gut wall. The patient recovered

## CONCLUSION

In conclusion I wish to reiterate and emphysize that smooth muscle tumors of the intestines although not common do occur frequently enough to be considered in the differential diagnosis of abdominal tumor and intestinal obstruction especially intussuscept ton when the attacks tend to be spontane ously reheved only to recur aguin from time to time. Moreover they must be considered in the differential diagnosis of large fixed ulcerating and obstructing growths of the rectum.

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## TUBERCULOSIS OF THE EPIDIDY MIS1

## A CRITICAL REVIEW BASED ON THE STUDY OF NINETY FOUR CASES

BY HEPMAN I ARETSCHMER MD FACS CHICAGO

THIS paper is based upon a careful retirem of 94 cases that have been under the author's personal observation. Special attention or special unity six was given to the end retult obtained as far as this was possible. Large series of cases dealing with ultimate end results are rare and among papers including a large series of cases may be mentioned those of Batney Keve. Schoon over Batbilian and Soderlund.

No attempt his been made to review the literature exhaustively or to discuss in detail the different forms of treatment recommended by the various authors but rather to present data available in a eries of cases under per

sonal supervision

There seems to be a general tendency at the present time to study end results obtained in various surgical diseases. Heretofore papers dealing with end results have been very few and far between The papers for a long time dealt chiefly with the problems of diagnosis and differential diagno is a well as with sur gical technique. It is needless to di cuss the various factors which have stimulated the medical profession as a whole and the doctor as an individual to survey his accompli h ments in order that one might determine ex actly just what has been accomply hed by one or another form of treatment. Often it is true various types of lesions occur so infre quently that one is not in a position to com mand a survey of a large number of cases In these circumstances the criticism that a study of a small group does not suffice as more or less justifiable but if a sufficient number of papers are reported even though the number of cases studied which deal with end results is small the data which accumulate cannot be other than worth while

Tuberculosis of the epididymis represents a type of lesion which occurs o infrequently that papers dealing with a sufficient number of end results have been exceedingly few and far between AGE

The general belief that tuberculosis of the puddymis is a disease that occurs in early adult life is verified by the data in the present series of cases. There were 4 patients in this series under o years of age. The youn est patient was 17 years old and the oldest was 65 years old. In each decade between these two extremes cases were recorded. The largest number of cases that occurred in any one decade was 37 in the third decade or 39 per cent of the total number of 94 cases (Table I).

TABLE I -AGE OF PATIENTS

4c	Case
U de	4 8
3 1 30	37
4 t 49	ő
s to so 60 1 60	3
\ t t t d	_
Tot !	94

Barnes has had an unusually interestin experience with this disease in children. He recently reported a series of 11 cases in chil dren between 9 months and 14 years of age Barbilian in his series of 145 cases reported 19 patients between the ages of 15 and 20 years

#### TR MUMA

The question as to whether or not trauma is a factor in the decelopment of tuberculo is of the epidid mis has been under discussion for a long time. Some years ago the question was of purely academic interest but today it has a new interest namely an economic one because of the Workmen's Compensation Acts and the problem of fixing liability. Not un commonly patients state that their trouble followed in injury sustained during their the ployment and the cases are brought before an industrial board. The relationship between tuberculosas of the epididymis and trauma sustained during work is therefore a most important one.

In a recent paper by Cathcart the relation ship between muscular strain and tuberculosis of the epididymis is exploited emphasis being given to the medicolegal aspects of the sub ject In Cathcart's case the patient was suffer ing from tuberculosis of the epididymis and sued for compensation on the ground that the disease had arisen after a severe strain in the course of his work. The decision in this case turned upon the answers to two important surgical questions The first and crucial one was whether or not a severe muscular strain of the abdominal wall can within an hour or two set up an acute orchitis and epididy mitis apart from any direct injury to the parts and in the absence of any gonococcal infection of the urethra The second was whether or not such an attack of acute inflammation could be the exciting cause of subacute tuberculosis of the affected parts

Cutbeart concluded that acute orchuts and epididymits may be caused by severe abdom inal strain without gonooccal or other organ ismil infection of the urethra or the parts affected that the acute inflammation is some times the result of torsion of the cord and that the acute orchitis and epididymits thus produced may end (a) in an active tuberculous affection of the epididymis either by exciting a latent focus of tuberculosis or by giving rise to the conditions suitable for the development of a new focus or (b) in complete atrophy of the testicle. In the case that formed the basis of Catheart's paper the sheniff ruled that the claimant had not proved his case

Trauma as an etiological factor may be classified under the following headings (1) direct (2) localizing and (3) mobilizing

r Direct trauma By this is meant the direct implantation of tubercle bacilli into the epididy mis. This probably never occurs in the production of the disease and is more theoretical than real hence should not be considered as a factor.

2 Locali ing trauma A number of author thes believe that the role played by trauma is purely one of localizing the tubercle bacillihence a definite period of time must elapse between the injury and the development of the disease. One of the fallacies of this theory in its application to a given case is the great

variation in time between the injury and the onset of the disease. In the present series there were 30 cases in which there was a his tory of trauma 47 cases in which there was no history of trauma and in 17 cases the records failed to state this point.

For years the theory of localizing trauma has had many adherents. As a result of the injury to tissue following the trauma its resistance is so greatly reduced that a locus minoris resistential results and a suitable land ing place is effected for the tubercle bacilli circulating in the blood stream. The local hamorrhage and the presence of necrotic tissue provide a suitable culture medium. The absorption of bacilli is hence interfered with because of the interference with the blood and lymph circulation following the trauma. The weak point of this theory is the fact that nothing is known of the condition of the testicle and epididymis prior to the injury.

Many authors refuse to accept the explanation in regard to localizing traumamong them Cathelin Jeanbrean and others who hold that the tuberculous process was present in every instance at the time the injury was received.

3 Mobili ing trauma Many clinicians be lieve that the question of trauma is concerned purely with a mobilizing trauma and that the injury either direct or indirect reaches a focus of tuberculosis heretofore not recognized hence its presence has not been revealed. The trauma causes an acute flare up or causes the tuberculous process already present to be come worse For example a well developed tuberculous process is discovered in an epi didymis immediately after an injury in which case the trauma simply served as a means of recognizing the tuberculous process. These views are subscribed to by many clinicians notably Cathelin Jeanbrean Morton and others

In the light of these various theories it is interesting to note the statements made by patients from the standpoint of time that had elapsed between the injury and the onset of the disease. In one instance there was an antecedent history of an injury to the right testicle 18 years before the patient came under observation and 6 years later the testicle was

removed for tuberculosis. In another case the patient fell and injured the right testicle 17 years before and the testicle was removed 1 year after the injury. In another case the patient fell from a tree and injured the left testicle which subsequently underwent abscess formation. There were 24 cases in which the patients gave a definite history of injury to the testicle which became the seat of tuber culous disease. Unfortunately a history of trauma was not elicited in many of the early cases.

Another factor namely the various types of injurie which preceded the development of the tuberculous disea e is of intere t. Be cause of the polible me heologial a pect dissipute ion in connection with the Workmen's Compensation Acts the e-type are listed.

Types of injuries mentioned as preceding the onset of the trease fell at work pinched by trousers strain from moving machinery struck with pick handle fell from a tree hit by box injured in football game strain in pulling, cable, drag jumped at patient fell astride a lo, throwing bales of has shrappad wound over thigh hit testicle and later ran for a car fell on a truck taking child on lap gunshot wound in hip kicked in hip playing when a child fell off hay loft. In other cases only an indefinite statement regarding strain such as that due to heavy hitting etc. was made

#### PRIVICUS VENEREAL DISPASE

In view of the fact that tuberculosis of the epididymis may be confused with whiles and that differentiation from syphilis 1 necessary it is interesting to note that there was a positive history of syphilis in only 5 cases The early cases have no record of any Wassermann tests but the late case because the Wasser mann test has been done in recent year as a routine measure have a record. In this series there were 45 cases in which Wassermann tests had been made but in only 5 cases was a posi tive reaction reported and in these cases syphilis was only an incident since the his tological examination showed that the process was fundamentally due to tuberculosis and not to syphilis

In all probability gonorrhea plays a less important rôle than was formerly supposed Certainly a large number of patients develop tuberculosis of the epididy mis who has enever had gonorrhea. In this entire sense there were only 27 crises that gave a history of an antecedent attack of gonorrhea. A history of a previous attack of epididy mits was obtained during a gonorrheal infection and in some it occurred in the tibsence of a recent gonor thead infection as far as it was possible to determine. In the latter type of case the epididy mits may have been due to an old nonspecific eminal ve iculties.

His part of the patient's history should be accepted or rejected according to their value. Thus in a given case in which the patient states that he had a previous attack of epididy mitis one must determine if possible whether the attack, was secondary to an old seminal vesiculitis or whether it was a tuber culo is of the epididy mis that had sub-ided and had remained dormant until recently fanned into activity.

On the other livind a condition much more difficult to interpret may be encountered in which a patient with a littent tuberculosis of the epididy mis which is not known or reconced by him acquires a gonorrhocal infection during the course of which he develops an epididy mits. If a gonorrhocal infection is superimposed upon a tuberculous infection is may be the direct underlying reason with the tuberculous infection is not at first reconized. The only possible differentiation then is the unusually prolonged course of the supposed acute gonorrhocal epididy mits. One of our cases presented this picture and the situation was confusing for a short time.

## ROLE OF PHYSIOLOGICAL CONGESTION

It is generally admitted that the lar est number of cases of tuberculosis of the epi didyms occur between the ages of o and 40 years the period of life when there i the greate it sevual activity and a correspondin increase in the blood supply. Whether or not this factor plays any decided rôle is still an open question.

PRESENCE OF TUBERCULOSIS PLSEWHERE IN THE BODY

In view of the fact that it is generally assumed that tuberculosis of the epididymis is always a secondary process it behooved us in studying our cases to search very carefully for the presence of tuberculous disease in other parts of the body

Nothing is so important is an aid in estab lishing a diagnosis of tuberculosis of the un nary or genital tract as the elicitation of a good accurate history from the history one often obtains information relative to previous attacks of tuberculosis in other organs or in a history of surgical operations for tuberculous disease and finally the patient may volunteer the statement of being under treatment at the present time for tuberculosis elsewhere in the borty

Extrapulmonary tuberculosis In the early cases in this series not enough emphasis un fortunately was placed upon this part of the history and some of the records do not men tion anything about antecedent tuberculous disease In a review of this series however evidence of intecedent tuberculous disease was obtained in 15 cases with the following distribution tuberculosis of the kidney in 10 cases of the Lidney and hip in a case of the spine in 2 cases of the shoulder in 1 case and of the glands in the neck in z case

Tuberculosis of the lungs In all of the later cases great emphasis was placed upon trying to determine whether the patients had any evidences of pulmonary tuberculosis. In some of the cases it was rather easy to obtain a history of antecedent tuberculosis such as protracted cough night sweats or a history of pleurisy Particular stress was placed upon this point so as to determine lung involvement and it was interesting to note that in a certain number of cases the internist had declared the lungs negative and the roentgenologist had reported the evidence of an old healed tuber culous disease. Nevertheless the most im portant point is to determine whether or not there is lung involvement Whether the dia, nosis is made by one or both methods is irrelevant

If we include in one group cases in which the diagnosis of pulmonary involvement was made both clinically and roentgenologically we find that in 75 cases or 798 per cent either the clinical or the \ rav examination showed evidence of tuberculosis either active Involvement of the bones was or healed found to be present in 4 cases the spine in 2 cases the shoulder in I case and the hip in r case

#### RECTAL FINDINGS

The information obtained in this series by means of rectal examinations agrees in the main with the conclusions reached by Barney and others in connection with this phase of the subject. The value of the rectal examina tion must always remain subject to a certain amount of criticism If the rectal examination is positive well and good but on the other hand a negative rectil examination does not necessarily mean that there is not a small focus of tuberculosis either in the prostate or vesicles It is obvious how one might miss a tuberculous nodule in the prostate or vesicles on rectal examination under certain circum stances

The statistics of Cunningbam who autop sied a large series of cases are of interest. In his series of 4 250 autopsy records he found 35 instances of tuberculosis of the epididy mis and in 25 (nearly 71 4 per cent) of these the prostate and vesicles were involved. In his series of 86 clinical cases 40 (nearly 57 per

cent) gave positive findings

It should be remembered that frequently an early examination may prove negative while a later one may disclose evidence of associated disease at this point. In our 04 cases there were 85 in which the results of the rectal examination were recorded but in o cases this information is lacking. Of the 85 cases there were 70 in which the records showed positive changes in the prostate or the seminal vesicles or in both Naturally the largest number of positive cases occurred late in the course of the disease. If we reduce the number of positive rectal findings we have 82 35 per cent of positive findings figures tally with those of Barney series of 101 rectal examinations of patients with tuberculous epididymitis he recorded the prostate as being tuberculous in 76 cases

or 75 per cent. I believe that his estimate of 75 per cent is conservative.

#### ONSET

By fir the largest number of patients with tuberculous epididy mits had a slow gradual onset and the disease as a rule began long before the patients came under ob ervation Often the patients came under ob ervation often the patient had no p un and discovered anodul quite by accident or often the nodule was discovered during a routine physical examination so that the patient was unable to say just when the tuberculous process began On the other hand in many instances a very definite date of onset was given [14ble II]

#### SIDE INVOLVED

It is the general consensus of opinion that tuberculosis involving one epididymis is fol lowed sooner or later by an involvement of the opposite side so that eventually both sides are the seat of the tuberculous process. In this series of 04 cases there were 37 in which there was a subsequent involvement of the opposite side or reduced to terms of percent age equals 30 36 per cent Barnes in his series found that in 41 6 per cent the opposite side became involved By means of a very careful survey of this eries and by personal examina tion of the patients or where this could not be done by personal correspondence it was found that there were 48 cases in which no subsequent involvement of the other side took place and o cases in which no statement rela tive to this question was obtained. There were 4 cases in which there was bilateral involvement when the patients pre-ented themselves for examination and in which the process began on one side and these added to the 32 that had involvement of the other ide makes the total number of bilateral cases 27 or 30 36 per cent It is very interesting in the study of the question of involvement of the opposite side to note the large number of cases in which this involvement took place rather early In this series involvement of the other side occurred in is cases during the first 6 months and after 6 months in 17 cases \o time was mentioned in 5 cases There does not seem to be much difference regarding the sides involved. In 48 cases the patients presented involvement of the right side in 41 cases of the left side in 4 cases of both side and there was no record in 1 case

## SYMPTOMS

It was to be expected that these patients would have more or less pain. As a rule the pain was referred to the testicle but strictly speaking it was not limited to the testicle fin 6 croses in this sense it was referred to as being, doing the cord and in 8 cases it was referred to the groin. Some of the patients complained of pain in the thigh and occasionally in the crotum. Therefore too much depend ence should not be placed on the patients statement with regard to the location of the

Urinary symptoms Early in the course of this disease there was rirely if ever a refer ence to unnary symptoms Thus in 43 of the 94 cases in this series or 45 7 per cent there were no urmary symptoms Gradually how ever many patients complained of various urinary symptoms The urinary symptoms depended in part upon whether the tubercu lous process began in the epididymis or in the kidney For example when the tubercu losis of the epididy mis followed a tuberculosis of the kidney many of the urinary symptoms were due to involvement of the bladder and often the symptoms of tuberculous cystitis were present before the onset of the tubercu lous epididymitis but when the patient re ported for examination for tuberculous disease in the epididymis he would naturally mention the fact that he had unnary symptoms In another group of cases in which there was no higher involvement in the urinary tract and in which instance the urine showed only a few leucocytes urinary symptoms were present due no doubt to manifestations of tubercu losis in the prostate or in the seminal vesicles or in both. In some of these cases more than one urinary symptom was present. Table III shows the most frequently mentioned symptoms.

#### TABLE III -SIMPTOMS

	C
Frequency	42
Hæmaturia	23
Burning	22
Painful urination	21
Backache	ı
Fever	10
Urgency	9
Diffculty	8
Incontinence	4
Dribbling	j

Urinalysis The urinary findings in this series of eases are extremely interesting in that they show the presence of abnormal elements in the urine in a large number of eases The presence of pus in the urine varied within rather wide limits In some of the cases in which the tuberculous process in the epi didymis was secondary to an advanced uri nary tuberculosis the patient had urin iry findings of much more serious moment than were found in the cases before there was much involvement of the urinary tract. The striking thing about reviewing the urinalysis in this series is the fact that in 72 of the 94 cases some pus was found Table IV shows the results of the urinary examination

## TABLE IV -URINALASIS

	C se
Pus	72
Mbumin	30
Red blood cells	23
Bactena	ō
Ca ts	-
Tubercle bacilli (either on smear guinea pig mocula	
tion or both)	13

#### ABSCESS FORMATION

In a certum number of instances the tuber culosis progresses and abscess formation oc curs. In this series of 64 cases abscess of the epididi mis was found in 30 cases. Often the abscess ruptures externally or is opened surgically and a scrotal fistula results.

## VAS DEFERENS

One of the diagnostic points that has been mentioned from time to time is the condition of the vas deferens the statement having been made that unless there is some evidence of pathological changes in the vas deferens the patient does not have tuberculosis of the epididymis This probably is a good clinical rule to follow since in 94 cases in this series 55 had involvement of the vas deferens In 63 cases in which this point was mentioned it was positive in 55 cases or 873 per cent negative in 8 cases and in 31 cases was not mentioned It may be that the percentage of cases in which there was involvement of the epididymis was higher than is apparent from these figures There can be little doubt as to the fact that if a tentative diagnosis of tuber culosis of the epididymis is made and the pa tient does not present involvement of the vas deferens one should be cautious in making a diagnosis of tuberculosis Failure to heed this advice in one case led to the wrong diagnosis a diagnosis of tuberculosis of the epididy mis was made and attention was called to the fact that the was was not involved. This should have cautioned us to change our diagnosis but we did not At the operation a tumor of the testicle was found Barney in a paper read at a meeting of the American Association of Genito Urinary Surgeons has already ealled attention to the confusion in this differential diagnosis

#### SCROTAL FISTULA

As is well known one of the diagnostic points in favor of tuberculosis is the presence of a single fistula or multiple fistule in the scrotum which are either unlateral or bilateral. Not uncommonly the patient states that these fistulous tracts discharge purulent fluid for a while close and then reopen. In this series fistula were found in 33 cases none was found in 54 cases and in 7 cases no record was made as to their presence. Hydrocele fluid was found present in 18 cases.

#### END RESULTS

Of great interest as mentioned previously in this paper are the ultimate end results because of their importance from the stand Tot 1

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TABLE V —LATE CAUSES OF DEATH IN
CASES OPERATED UPON
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## TABLE VI -LATE CAUSES OF DEATH IN CASES NOT OPERATED UPON

# TABLE VII -- DURATION OF THE AFTER OPERATION IN LATIENTS NOW DEAD

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### TABLE VIII -DURATION OF LIFF AFTER ENAM INATION IN PATIENTS NOW DUAD AND NOT OPERATED UPON

point of prognosis. After a diagnosis of tuber culosis has been established what may the patient look for from the standpoint of life expectation? This question habeen of in terest not only to the patient and his family but for the life insurance company as well. After a diagnosis of tuberculo is has been made what ort of a rating should the patient receive from the company?

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TABLE IX —DURATION OF LIFE AFTER EYAM
INATION OF PATIENTS NOW LIVING AND
NOT OPERATED UPON
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TABLE Y -- DURATION OF LIFE AFTER OPER ATION IN PATIENTS STILL LIVING

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THOY IN PATIENTS STILL LIVING

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# TABLE A -- CONDITION OF PATIENTS NOW 11/10G WHO WERE OPERATED UPON

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In reviewing the ca es a study was made to determine whether or not patient who were operated upon lived longer than those who were treated without surgery whether the patients who were operated upon had different deaths from those who were not operated upon and finally to determine the cruse of death

In this series 78 patients were operated upon and of these 78 patients 16 are dead and 57 are living. The results in 5 cases are not known. There were no immediate deaths, but the conditions causing death occurred at varying periods after the patients left the ho-pital (Table V). The three most frequent causes of death in this group are tuberculous meningitis pulmonary tuberculosis, and military tuber culosis.

In the fatal cases not operated upon al though the total number is only 8 we sec a somewhat similar hut not exactly parallel cause of death (Table VI) The two most frequent eauses of death in this group are miliary tuberculosis and tuberculous mening its while in the other group the two most

## TABLE YII -- CONDITION OF PATIFNES NOW LIVING AND NOT OPERATED UPON

	Ca
Treated with tuberculin \o symptoms	
\o treatment \o symptom	
lo treatment lo improvement	1
	-
Total	

frequent causes were tuberculous meningiti and pulmonary tuberculosis

One patient who died 16 days after epidid mectom, had a very advanced case of pulmonary tuberculosis. He was operated upon under local mesthetic for multiple fistule which were di charging great quantities of pus. The operation was principally undertaken for the purpose of giving the patient ome degree of comfort.

One of the patients not operated upon lived 11 vears after the diagnosis of tuberculous of the epididy mis had been made. He finally died of permicious animus (Table VIII)

# THE DIFFERENTIATION OF THE REDUCING BODIES IN THE URINE DURING PREGNANCY

B REED ROCKWOOD WD AND EVVF DODGE BALTIMORE MARYLAND
F m h D na tm f M d 10b tr U tv f M sl d

N chinical laboratory work urines are frequently brought to the laboratory with the statement that a reducing body has been found and a request is made for a decision as to the type of carbohly drate which is present. These requests seem to come most often from the obsetencial ervice since it accessionally of clinical value to determine whether or nit the reducing substance is glucose or lactose.

An analysis of the situation shows that the obstetrician really de tres the nawer to cer tain questions (1) is the reducing body a sugar (2) if it is a sugar is it glucose or lactose and (1) if the sugar i gluco e is the patient a diabetic or is she suffering from only a harmless live our above.

The last que tion is reilly the only one of importance. If the patient is a diabetic she must be treated a such. All the other conditions can be ignored. Fortunitely true dribetes in pregnancy i rire but it extremely important to pick out the oc assonal case.

The first question is the mo t difficult to an wer in a ho pital laboratory ince a number of non-carbohy drate reducing substances may be present and the exact structure of most of these is not known. As a rule therefore the first question is answered by exclusion after the second and third are solved. If one can evclude gly costina and lateosuma and the reducing, substance is present in small quantities the a sumption is that we are dealing with a non-specific reduction.

In attempting to answer the second quetion we also run into miny laboratory, difficulties. When we extinite methods available for the identification of the type of carbohydrate in unne we find that there are only two which are practically applicable in the chincil laboratory the fermentation and the phinylhy drazine test. Both of these tests are subject to certain very definite limitations which mu the clearly understood by the dimean in the interpretation of the results it should be realized that from these two tests the laboratory cannot absolutely identify the type of carbohy drate but can give only an approximate result.

First only one strain of veast has ever been identified which ferments glucose exclusively without splitting some other carbohydrate and this culture has been lost. Second yeast also contains a decarboxylase which at time can split the amino acids present in urine with the production of gas Again bacteria may be pre ent which will split lactose to galacto e and glucose and thu allow the latter to be fermented by yeast Galactose itself is fer mentable to a small extent. In addition the quantity of the yeast and the time during which it acts must be regulated since the res piration of large quantities of 5 east may form some carbon dioxide from gly cogen Finally some samples of yeast may contain a small amount of diastase and this acting upon the constituents of yeast may produce a minute

amount of sugar at incubator temperature In the case of the phenyl osazones it is not possible to make an absolute identification from the morphology alone To be sure of the osazone it is necessary to make an accurate determination of the melting point and since the melting points of the common o azone he close together this is a matter of consid erable difficulty and beyond the scope of the ordinary ho pital laboratory. In urine the colloid which are present often prevent the formation of the o azone entirely or alter its morphology This is particularly true as re gard lactose It should be remembered al o that levelose which is sometime found in urine gives the same osazone as glucose

In view of these various uncertaintie it seemed desirable in order to determine just how rebable or unreliable are the reports from the laboratory to evaluate more carefully these two method both from the stand

point of performing the test and of correlating the results with the clinical findings in a eries of cases

At one time every obstetrical patient in the University Hospital had a routine urinalysis once a week Tach specimen of the urine which showed a yellow precipitate with Bene dict's solution was taken to the central lab oratory for further test Specimens which showed only a greenish color without a vellow precipitate were discarded. During this pe riod 556 specimens were examined and of these 160 8 per cent showed a yellow pre cipitate and were further examined. A comparison of the results of the tests was made with the clinical condition of the patients par ticularly with regard to whether they were secreting milk or colostrum

Host has made a careful study of the vari ous techniques employed for these two te ts and has developed a new standard technique which we have used throughout our work. It should be understood that our results should be considered as results secured only with this technique Host showed that the test carned out with phenylhydrazine hydrochloride is less sensitive than with phenylhydrazine since from ½ to 1 per cent of glucose must be added to normal urine before it is positive with the former reagent while the phenylhydrazine will secure positive results with concentrations of from o 1 to o per cent of glucose in urine I he details of the methods are given below

For the fermentation of urine bring the hydrogen ion to 5 5 or 6 8 This is best done by testing with brom thy mo blue against the Clark standards reaction can be adjusted if necessary by the addi tion of tartaric acid or sodium bicarbonate the urine to kill organisms which might affect carbo hydrates Cool then add fresh yeast so as to make an approximately 5 per cent suspension. Host rec ommends reading after 48 hours in the incubator We have found that incubation for this length of time results in a large number of non specific fer mentations and believe that the period of from 12 to 24 hours which is more commonly in use in this country is more accurate. As a matter of fact if large quantities of glucose are present gas is formed in a very short time

For the phenylhy drazine test place about a cubic centimeter of urine in a test tube and add 1 5 to 2 cubic centimeters of a saturated solution of sodium acetate in 50 per cent acetic acid and 3 drops of phenylhy drazine This is brought to the boiling point and the tube is then put in a water bath at 100 degrees C for about an hour The test tube is allowed to remain in the water bath so as to cool slowly and is not examined microscopically until the next day

We have found the widest variation in the morphology of the osazones particularly the lactosazones and it was only because we had seen so many intermediate forms that we were able to identify them in some of the specimens The small ray like fibers characteristic of lactosazone tend to disappear leaving small round darl globules with a smooth rim 1

The physiological osazone described by Host was observed in a few cases but all of these occurred early in the series and none was seen later Some minor changes in tech nique or seasonal change in diet seems to be an added factor in their production

Osazones of unknown type were seen in 5 urine specimens of lactating women. Two of these were irregular sheaf of wheat forms and these might possibly have been atypical glu In one the osazone appeared cosazones much like sunflowers with regular dark cen ters and long broad regularly arranged rays In another regular light brown bodies with out spicules were seen. The e were quite simi lar in morphology to a group of osazone which were produced by testing the non fermentable residue of molasses Still another specimen showed many small dirk o azones arranged closely together like bunches of grapes but without any spicules or projections

Matthews has recommended a rapid meth od of fermenting urine by the use of much larger quantities of yeast acting over a shorter We have tried this method on other occasions and found it satisfactory but in specimens such as those in this serie when only small quantities of reducing substance are present it gives non specific results since the reducing body in the urine is de troyed by yeast Thus in specimens from 15 patients which showed no fermentation by the ordi nary test the Matthews test de troved all of the reducing power in 12 thus pointing to the presence of glucose The reducing power re mained after fermentation in 2 and was doubtful in 1 case

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TABLE I --COMPARISON OF TAIT OF CARBO
HYDRATE WITH TEPTOD OF LACTATION-

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Cammidge believes that by absorbing the lactose from urine with a high grade of blood charcoal lactosazine can be more easily obtained. In a case in which no o azones were found by the ordinary technique none was found by the charcoal method and in a case lactosazone was sound by the charcoal method and not by the charcoal method.

Only few glycosurins occurred in our series so that the major portion of our work has been concerned with the identification of nonfermentable carbohydrate From our own oh servations in glycosurias in non pregnant cases and from the literature we can say that a markedly positive fermentation test under standard conditions usually means glucose When only small quantities of reducing sub stan e are present the difficulties of interpre tation are greater. Thus it should be noted that in our series the urines of 2 patients showed gluco a ones but they did not show more than a trace of fermentation All gluco sazones came from patients with glycosuria as there were no true diabetics in this series

The formation of lactose by the body is intimately connected with the period of the formation of milk. Colostrum has also been shown to contain lactose in varying quantities.

Table I shows the results of a comparison of our findings arranged according to the penod of lactation It will be seen that in the group of non fermentable carbohydrate in only about one half of the eases could lactosazone he identified morphologically. The presumption is that most of these reducing bodies should have been luctose. Whether this group which did not form os 12 ones represents lactose which cannot be identified because of interfenn substances in the urine or some other type of non fermentable carbohydrate cannot be de termined through this study but the former supposition is inherently more probable Anar rangement of the non lactating and colostrum cases is made in Table II chronologically in the course of their pregnancy We had rela tively few cases early in pregnancy

We may conclude therefore that if a marked fermentation occurs we are probably dealin with glucose. If an osozone of characteritic morphology is observed it is probably fairly specific but other combinations of results are inconclusive. Therefore because of the technical difficulties which we have encountered in these two tests it would seem from the literature and from our findings that too much reliance should not be placed by the chinician

upon them

I ortunately certain clinical short cuts are of help in connection with this problem and may be used to avoid a great deal of unneces sary laboratory work Thus Williams u in the fermentation test has shown that glucose is found 5 times as commonly in the last had of pregnancy as in the first half and that a reducing body found during pregnancy is prac tically always glucose and not lactose How ever during the period of breast engorgement lactosuma is present in a considerable propor This is due to the tion of nursing women fact that lactose is formed in the human body only during the period in which colostrum or milk is being formed in the breast. Our data in Table II (non lactating and colo trum cases) does not however support his general statement that not a single specimen taken during pregnancy showed the persistence of a sugar reaction after fermentation demon trat ing that the sugar found in the urine during pregnancy is always glucose

This discrepancy is probably due to the TIBLE II -- COMPARISON OF TYPE OF CARBO fact that Williams' series contains many cases

observed during the early months of pres nancy while most of our cases were studied from the ninth month on In fact only 3 of our cases showed neither colostrum nor milk in the breast. The o series should there fore be considered as a whole representing phases of the same problem. Thus as a ready rule of thumb it may be stated that a reduc ing body in the urine during pregnancy is lactose if the breasts are secreting and glucose

if they are not particularly in the earlier

months of pregnancy In answering the third question at the beginning of the paper as to the means of dit ferentiating gly cosurin from diabetes. Host of fers considerable help in his work in which he studied the gly cosuma of pregnancy by means of the sugar tolerance test. He showed that early in pregnancy (from 1 to 3 months) the gly cosum is of the hamic type that is there is no change in the renal threshold but there is some defect in the storage mechanism for glucose so that the blood sugar rises over the threshold and is therefore excreted in the urine During the latter part of pregnancy on the other hand the blood sugar rise is usu ally small but the renal threshold is often so

low that glycosuria of the renal type fre

quently occurs After the determination that the reducing substance is glucose the next step in the dif ferentiation of a glycosuma from a case of diabetes consists in the estimation of the fast ing blood sugar. If this is elevated it points to the presence of diabetes. If it is normal a flucose tolerance test is necessary for final differentiation Since this is costly in time and money both to the pitient and to the hospital it should be used in as few cases as possible Clinically a patient with gly cosuma particularly if it is not more than a few grams in 4 hours who has no diabetic symptoms such as polydipsia or polyuria who has lost no weight who has no acetone bodies in the urine and who has a normal fasting blood sugar can be considered for all practical pur poses to be non diabetic. This is particularly true in cases in which the gly cosuma clears up after delivery

HYDRATE WITH DUR ATION OF 1 PEGN ANCY-

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Til	10	_	-	-	6	,	-	

We may say therefore that in the majority of cascs

- A reducing body found in the urine of a pregnant woman during the period of breast engorgement is probably lactors rather than plucose
- A reducing body found in the uting of a pregnant woman during pregnancy and before the period of breast engorgement is probably glucose rather than lactose

3 Glucose found in the urine during preg nancy is almost always due to a gly cosuria of renal or hæmic type rather than to a diabetes

#### SUMMARY

- I Twenty eight per cent of a senes of urines from pregnant women showed reduc tion by the Benedict test
- z Osazones of unknown type occurred in 5 cases
- 3 The fermentation test according to the method of Host gives more specific results than does that of Matthews

The churcoil method for litting lictor izone was not succe sful in the few cases in which it was employed

s In only about one half of the non fer mentable specimens wa it no ible to isolite lacto azone. These came from patients with both milk and colo trum in the breat and from nen lact iting patient

( Certain clinical rule are given which seem to be ufficiently recurrite to follow in the average eve and the laborators work should be refered only in the occurrent diffi cult on c and then recepted with a certun imount of recrye a negative hydrizine to t

mis mein suls ome interference with the form ition of at able crystals of lactosazone

## RIBLIOGRALITA

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## DANGERS IN THE POSTOPERATIVE USE OF INSULING

By I DMUND ANDLING M.D. I.A.C.S. AND FAUTI REUTERSKIOLD M.D. CHICAGO

ALMOSΓ immediately upon the dis covery of insulin and its value in the A treatment of diabetes attempts were made to use it in non-diabetic conditions Within the last 5 years an enormous literature has grown up on the use of insulin in the treatment of various postoperative conditions and if the literature is any indication, the use of insulin must be very wide spread in the surgical clinics today There appeared in 1923 the pioneer work of Ibalhimer (1) work was elaborated by Fisher (11) in several reports tabulating 45 cases treated by this Subsequently others appeared to confirm the value of this treatment (10) Many patients were apparently benefited al though the results were not uniform but as Fisher warned us certain untoward effects were observed. Therefore in this form of treatment the blood sugar level should be controlled much more carefully than in cases of diabetes

A critical review of this literature in the light of modern medical knowledge of insulin action is to say the least not convincing. In the first place the whole rationale of this method is based on the early work of MacI cod (8). Banting (4) and especially of Ringer (19) on the standardization of insulin kinger's work on pancreatectomized animals showed that one unit of insulin will bring about the oxidizing of one gram of glucose based on the studies of the respiratory quotient.

The more modern viewpoint is that the action of insulin is much more indirect. The recent article of Eadie (15) and MacLeod (15) make it exceedingly doubtful that in sulin is concerned in any manner with gly colvisis. It has been shown beyond a doubt that the combustion of glucose within the muscle is not increased by the action of in sulin per se. The actual physiological effect of insulin appears to be three fold.

r It promotes the storage of glycogen in the liver

- z It converts glucose into some other herose more readily oxidizable
- 3 It brings about an increased affinity of tissue for water thereby causing a concentration of the blood

In two previous articles (3) it was shown by one of us that the action of insulin was coormously exaggerated and prolonged if the organism was markedly dehydrated Doses of insulin which under normal conditions produced a slight full (15 milligrams of blood sugar lasting for hours) would cruse a profound and even dangerous hypoglycamia in dehydrated animals. The theoretical consideration of this phenomena are discussed at greater lengths in one of these propers

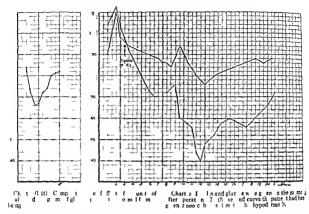
## EXICRIMENTAL

With this point in view the action of insulin after operations was studied in a number of patients. Blood sugar estimations were mide by Byrd's modification of Polin Wu. By this method blood sugar estimations can be made by 0 i of blood and by making estimations every 15 to 30 minutes all the details of the curves become evident.

Ether an esthesin cases only were used Twelve to eighteen hours after operation at the height of the reaction 10 units of insulin were given subcutaneously (Lilly Hetin units o) and 25 grams of glucose

Cur e 1 is a composite curve of the effect of ro units of insulin and 2½ grams of glucose per unit (5 grams) in normal human beings. The result as can be seen is about a 15 milligram drop in blood sugar with a return to normal within hours. If the results of insulin and glucose after operation were comparable to this it would be a highly valuable procedure. However the dehvdration which results from the starvation and the acidosis accompanying practically every surgical procedure results in a profound and dangerous hypoglycamia.

Cur e 2 illustrates this point. The insulin and glucose were given the morning after the



peration. The blood sugar was alreid; low as a result of the 4 hour starvation. The resultant fall in blood sugar va rapid and profound. The injections had been given at b o clock in the morning and by 1 o clock in the afternoon it was 39 and the patient had begun to twitch. He was then rescued by the idministration of glucose.

The other curve represents a similar experiment on a patient who had been flooded with ooc cubic centimeters by hypodermodysis and it will be seen that the insubn effect was light and trunsient

ture 3 represents a more accurately con trolled experiment. Two curves are given of the blood sugar following hermotomies

The conditions were identical except that one patient had no fluids except small sips hours. The other got very large amounts by proctocly as and hy podermoclysis (a coo cube centimeters). The intensity and length of the insulin action in the two cases is cuident. The hydrated man had practically no insulin action. The other had a fall in blood sugar of 35 milligrams which lasted for 13 hours.

Cur e 4 shows the practical abolishin of the insulin effect by the administration of ooo cubic centimeters of saline followin a

slight operation

The lower curve shows that the operation per se is not the factor producing this phe nomenon. This patient had no operation. He was dehydrated for another purpose and it is evident that the insulin action is here very markedly evargerated.

#### DISCUSSION

It is evident from these curves that the use of insulin and glucose in patients who are suffering from postoperative conditions and are therefore unavoidably dehydrated is a highly dangerous and useless procedure. It must also be remembered that in touc could tions fluids are fixed by colloids and rot available for physiological purposes and that the free water in the organism is therefore reduced even more than the total water. This condition (fixation of free water) is physiologically equivalent to dehydration What these patients need is glucose and water.

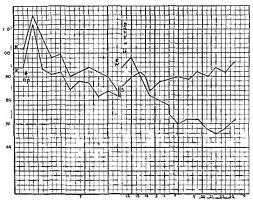
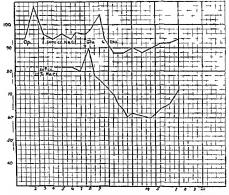


Chart 3 Curves showing blood ugar following hermotomics



They are starved and thirsty and have a con stant hypoglycemia and insulin not only does not produce any glycolysis but it tends to lower the already low blood sugar still further. This insulin hyposhycemia is not only marked but often reaches the danger point and the amptoms of happelacamia are so imilar to many other postoperative complications that their recognition is exceed in ly difficult

In none of the previou reports and experiment on the u e of insulin and cluco e injections after operation was ins circlul estimation of blood sugar made such as was mide in the case reported. One or at most two blood ugar estimations were made. It is very evident from 1 tudy of our curves how confusin such a procedure would be In the fir t place the ether ana sthesia produced art in the blood ugar of moderate intensity la ting for from 2 to , hour In the next pla e insulin injection it elt produced a tran jent ri e in blood ugar before the fall began For these rea ons the presious work on this subject cannot be con idered of great value

Another thing to be considered in such work the o called I cudero effect (a) If an organism receives glucose there is first a hyperglycumia After this generally in a few hours there is a marked hypochicamia last ing for several hours. This is due to the fact that the carbohydrate storing mechanism is speeded up by the high blood sugar and confinites to overact

Also to be considered in this connection is the effect of insulin as already mentioned of concentrating the blood Following am op eration there is often a passage of flinds and protein into the tissu's and insulin instead of correcting the condition merch tends to evaggerate it giving rise to a vicious circle That is the more the blood is concentrated the more the insulin acts and the more the blood concentrates

#### CONCERNION

In postoperative acidosis and dehydr ted conditions tlucose and water are needed Insulin is not only not needed but its by it definitely contra indicated

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## HÆMOLYTIC ANÆMIA IN PREGNANCY¹

BY WILLIAM MILAN MD CHARLOTTE NORTH CAROLINA

THL permicious anæmia of pregnancy is an acute hemolytic rnæmia which L occurs in women under 35 years of age is due to pregnancy progresses steadily with out remissions to death or recovers and is curable by blood transfusion. Thus it differs from Addisonian pernicious anamia which is essentially a chronic disease of unknown etiology occurring after 35 years of age predominantly in men is not curable by blood transfusion and runs a course characterized by remissions

About a per cent of the cases listed as per nicious anemia (4) occur during or shortly after pregnancy In the British Isles this anemia is seen once in every oco to 10 000 pregnancies Hoskins (11) considers the con dition common in Northern India and Mc Swinney (14) finds an incidence of 1 bo per cent in one of the Calcutta hospitals Swinney's cases were chiefly among Hindus while in Bombay Brifour (2) found this anæmia proportionally much more common among Mohammedans a fact which she attributes to their confined life during preg There are no figures for the United States but from the reports of Smith (24) of Rocky Mount and my own observations in Charlotte I suspect that this condition is not very infrequent in North Carolina

Balfour says that in Bombay this anomia is more prevalent during the last halt of the vear because of the great number of diarrhocal

cases at that time

Of 500 cases taken from the literature ( 7 8 11 12 14 15 16 1 27 25 24) 75 per cent occurred in patients under 30 years of age and

o per cent occurred in primipare

The appearance of the patient is that seen in any severe anamia. There is a lemon tint to the skin in half the cases (22) Puffiness of the face and feet is common. The symptoms ire those of any severe anamia, weakness vertigo dispuar pulpitation poor vision and especially sore mouth distributioned vomiting. There is senerally fever (Schmidt reports fever in 97 per cent) starting a day or

two after delivery and frequently leading to the mistaken diagnosis of sepsis

The physical findings include blanched mucous membranes retinal hemorrhages (1 11 21 22) sore tongue a great variety of heart murmurs enlargement of the spleen (Balfour 18 per cent Larrabce 70 per cent Schmidt 30 per cent McSwinney 16 per cent) and less often enlargement of the liver (Balfour 8 per cent I arrabee 16 per cent) with slight ordema often limited to the face Probably because of the short duration of the anæmia cord lesions have not been demon strated though pain and paræsthesias are common (21 22) The blood pressure may be low as in anomia generally or it may rise as in other toxumins of pregnancy (21)

About one half of the cases show a variable amount of albumin in the urine with uro bilinogen and occasional casts. Hoskins has reported bile in the urine. There are no other

urinary findings of interest

The gastric juice may show diminished or absent free hydrochloric acid (21 achlorhydria is not the invariable rule here as

in chronic pernicious anymia

The blood picture is very much like that of ordinary pernicious anæmia with greatly diminished hamoglobin and red cells a high color index and the usual variation in size shape and staining reactions of the red cells The diameter of the red cells is decreased (8 15 2) rather than increased Nucleated red cells are present but in the majority of cases these are normoblists. The platelets have been reported as diminished (1 8) or normal (15) The bile pigments in the blood are increased. Minot reports increased fraul its of the red blood cells with 16 per cent reticulocytes in one case before delivery both of these factors promptly returning to normal after delivery. There is some discrepancy of opinion about the number of white cells Auhertin says that there are generally more than 15,000 and in 55 cases he had never seen than 4 000 Schmidt reports 10 000 or more leucocyte in 68 per cent of cases and

less than 6 000 in 8 per cent Rowland says there may be a leucocytosis regularly during the rapid hymo-enesis of convalescence as well as in the early so called physiologic stage

of the anamia and cites one of O ler's (10) cases in which there were 45 000 leucocytes other observers report leucopænia frequently

2 1011 25 2 500 (1

A tabulation of some of the cases recently reported (1 3 0 , 8 11 12 14 15 16 10 3 4) show an werage hemoglobin of or per cent in 101 cases and an average red cell count of 1 46, 000 in 137 cases giving an average color index li htly above i in s cales the leucocytes iveraged 6,46 with nolynuclear 55 per cent lymphocytes 6 ? per cent large mononuclear 4 per cent and eosmophile 1 , per cent

The turms come on in idiously during the later month of premanes and is gener illy di covered hertly ifter delivery carriage or premature labor is the rule. The lo s of blood during labor is les than normal The child fortunitely does not share the mother's an imin (1 15) The course may be rapidly downward to death within a week or recovery may on ue after several months of

After the uterus is empty blood transfusion stops hamolasis and leads to prompt re covery in go per cent of the ca es (3 & 10 11 13 16 1, 20 21 4) I can tind no record of recovery before delivery and Auber tin his recovery is unknown except after the uterus has been emptied. Rowland recommends that this measure be carried out promptly Without transfusion 84 out of 11 patients or 40 per cent have died ( o i i4 15 16 19 21 3 24 25) Gallupe and O H tra place the maternal mortality at 50 per cent Larrabee at 75 per cent and Delmen (5) at S, per cent McSwinney had a mortality of 5 per cent in 45 hospital patients in Cal cutta and Balfour reports a mortality of 42 per cent among 150 patients een by her in Bombay

The changes found at autopsy as described by Schmidt and by Balfour are similar to those found in chronic pernicious anamia That this anomia is due in some way to pregnancy seems obvious but speculation as

to how pregnancy produces it does not seem profitable in the present state of our knowl edge As emphasized to years ago by Schmidt blood transfusion is a life saving measure but this fact is not as well known as it might be

As was to be expected following the work of Minot and Murphy the feeding of liver has been recommended in mild types of hamo h tic anemia by Murdock (16) but in a lar e percentage of instances the process is too neute to warrant the institution of a dietary therapy It may be that liver feedin after transfusion will be beneficial and it will be very interesting to see what liver feeding dur in, pregnancy may accomplish in preventing this inamia However when one of these ct es is recognized prompt transfusion i certainly the safe t therapeutic measure

CASE 1 In 1010 I sa with Dr F D Austin a young primipara 3 months after normal del ers at term She had der loved diarrhæa a month or o befor labor and this had continued durin the 3 month since labor I vamination of the blood showed hamoglob n 35 per cent red count 940 000 color index 18 white count 6 000 with a normal diff rential count. There were 420 nucleated red cells per cubic millimeter. The patient recovered

completely on symptomatic treatment

Case 2 In April 19 4 Dr J A Anderson of Gastonia referred to me a young marr ed woman 19 years old with a rather will marked seco dary anæmea The previous Jinuary she had had a mis carnag at the end of the s venth month and a neck later had cedema a greenish 3 llon color and vent into collapse but gradually improved under symptomatic treatment. The next year she we t

through normat pregnancy and labor 1 ithout an emia Case 3 In July 1925 I saw with Dr Vann Matthews a noman of 30 years 5 weeks after h ! third pregnancy had terminated at term by normal labor. She had few r beginning the day after labor and at the end of 3 neeks had a greenish look A ck before I sa her Dr Matthey's had given her a transfusion The hemoglob n was then 35 per cent and there vere 1 108 000 red cells and 2,400 hite c Its Dur ng the week after her transfus on she had suffered from an inf cted arm a d rolent herpes labual's so that I hen I saw her the hamo

globin was 25 per cent red cell 832 000 color i dex 5 white count 2 700 with polynuclears 55 per cent hamphocytes 44 per cent and eos nophiles 1 per cent The red cells showed considerable vana tio in size shape and staining reaction a d a fen normoblasts were seen Mer another transfusion this patient made an une c tful recovery and swel

CASE 4 In March 1926 Dr James Davis of Andesboro brought me a young married woman of 24 years Six weeks before she had had normal abor following a 9 months pregnancy During the puerperium she had fever daily and had become stendily paker and weaker but had refused to go to the hospital until it became evident that she would die She was seen at midnight Temperature was 101 degrees pulse 125 respiration 46 with marked air hunger. The patient was comptose and restless Her skin was very pale with a strong lemon tint There was some cedema of the face but none else where The examination of the blood showed hæmo globin 25 per cent red count 742 000 color index 1 8 white count 6 600 with polynuclears 66 per cent lym phocytes 33 per cent basophiles I per cent the red cells showed marked variation in size shape and staining rejection and many nucleated reds were present including typical megaloblasts. The urine showed only a trace of albumin but was positive for urobilinogen The patient was at once given a citrate transfusion by Dr Barret and a second one the next day. At the end of 10 days she was sent home with a hamoglobin of 50 per cent and a red count of 3 472 000

On August 31 19 7 Dr Barret and I were called to Wadesboro to see this patient again. Her third pregnancy had ended at term with a normal labor 10 days before A week before delivery the hemo globin had been 50 per cent and the red count 2 500 000 The day before delivery her blood pres sure mache 1 160 Urine showed albumin and casts in abundance. For 2 weeks after delivery she was apparently holding her own but then developed an abscussed breast. The hæmoglobin dropped to 30 per cent and the red cells to 1 29 000 The color index was II She had had fever ever since de When the patient was seen on August 31 the hemoglobin was 10 per cent and the red count was 960 000 with great variation of size shape and staining reaction of the red cells Many normo blasts were seen but no megaloblasts. The white count was only 2 500 with 70 per cent polynuclears She was given 800 cubic centimeters of blood by direct transfusion by Dr. Barret On September 28 Dr Davis reported that the hamoglobin was 65 per cent the red blood cell count 2 800 000 and the white cell count 5 000. The patient was steadily improving

There have been some reports of the recurrence of this anomal in subsequent preg nancies. Murdock thinks there is a strong probability of recurrence and thought it likely that his second patient had suffered with homolytic anomal following labor 6 years previously. In the second case reported by Gallupe and O Hara there was a history of anomal in each of the 3 preceding preg nancies severe enough in the next preceding

pregnancy to have kept the patient in bed for a few weeks

Huhr (9) reports the case of a woman agone a who presented a picture of permicous anemia in 10 0 8 weeks after deliver. In the spring of 19 3 she returned 3 months pregnant and a nun presented a picture of permicous anemia. She died the next year with Hodgkins disease.

Octingen (17) reports the case of a woman with hemolythe aritims following her third pregnancy who had had severe anomia of some sort with her first pregnancies. To prevent recurrence she was sterilized. Keist (o) reports the case of a woman who had been chlorotic from her fifteenth to nane teenth years. She was anomic during the first and second pregnancies and after her third pregnancy presented a picture of pernicious anatum. She was sterilized to prevent further recurrence.

Vermelin and Vigneul (25) report the case of a woman whose first pregnancy was normal in the fifth month of her second pregnancy she showed pernicious anomia and mis carried during the eighth month with fetus stillborn. She was clinically normal the next year but aborted during the second month of her third pregnancy. Three months later she again became pregnant and in the seventh month of this fourth pregnancy showed the picture of pernicious anomia. Premature delivery was induced. The pitient died 2 days later.

McSwinney saw a woman during her sixth prigarine, with hemoglobin 40 per cent white blood count 3 000 000 color index 66 A year later at the time of her seventh labor the hemoglobin was 35 per cent with red count 2 000 000 color index 88 The patient grew ripidly worse and died 5 days after labor

These reports on recurrence show that the patient een in two succeeding pregnancies by Halir died a veri later of Hodgkin's disease. The patient seen in two succeeding pregnancies by McSwinner died within a week after the second labor. The others all saw women who gave a clinical history of anamia with previous pregnancies. The fourth case reported was seen in two succeeding preg.

nancies cich time with less than 1 000 000 red cells and in each incidence recovered promptly after transfusion

Because of the rarity of recurrence and the promptne s with which this anamia can be controlled by transfusion sterilization of these patient to prevent possible recurrence seems to me entirely unwarranted

## SUMMARY

the hemolytic inamia of pregnancy is an acute condition and should no longer be da incla pernicious anamia

It re ponds promptly to blood trun fusion after the uterus has been emptied

The danger of recurrence need not be a contra indication to pregnancy and calls for nothing more radical than proper super vi ion of the patient during sub equent preg nancies

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## CLINICAL SURGERY

I ROM THE BRONCHOSCOPIC CLIMIC OF THE ROYAL VICTORIA HOSPITAL

# THE TECHNIQUE OF BRONCHOSCOPIC PNEUMONOGRAPHY WITH LIPIODOL

BY DAVID H BALLON M.D. FACS MONTREAL CANADA

INCE the epoch making introduction of h podod in ry2 by Sicard and Forester (13) in the diagnosis of bronchopulmonary lesions numerous methods have been devised for the injection of hipodol in the bronchial tree. These methods can be classified into two groups the direct bronchoscopic (2 and 3) and the indirect intratracheal methods.

Our purpose here is not to discuss the merits difficulties and dangers of the different intra tracheal methods—they all have their place and importance—but rather to emphasize the value of the direct bronchoscopic method for pneu monography (5) for the following reasons

I The invaluable aid afforded by direct in

spection of the bronehial tree

- 2 The possibility of making a bronchoscopic diagnosis taking uncontaminated cultures for diagnosis and vaccine therapy removing stenosing granulations (4) and aspirating pus from drowned areas of the lung and thus allowing a more thorough filling of the region of the lung to be investigated
- 3 If lipiodol has any therapeutic value then it is most desirable that before it is introduced bronchi and cavities filled with pus and debris should first be cleared as thoroughly as possible in order that this iodized oil can act directly on diseased mucous membrane and its effect be observed at a later date.
- 4 As our knowledge of the interpretation of lipiodol roentgenograms is still very imperfect and in order to avoid grave diagnostic errors the bronchoscopic method remains essential for the elucidation of roentgenograms and the climical indigings.

## INDICATIONS

Every case for pneumonography must be con sidered by itself and a decision arrived at by the internist surgeon roentgenologist and bronchos copist before the injection is carried out. As a general rule the cases suitable for injection are all forms of chronic bronchopulmonary and pleural suppurations in which a differential diagnosis be tween bronchiectasis (6) lung abscess broncho pleural fistula and empyema is required also a more accurate differentiation between upper and lower lobe lesions. Lipiodol may be used in cases of acute lung abscess (9) in which other methods have failed to demonstrate a lesion. It is par ticularly valuable in lesions of the left lung masked by cardiac shadow and pleural thickening

Lipiodol can be used with comparative safety, in carefully selected cases of the surgical type of pulmonary tuberculosis which show definite evidence of resistance. After extrapleural thoraco plasty lipiodol injections will demonstrate the efficiency of collapse and reveal the cause for persistent signs and symptoms.

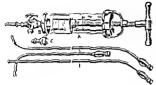
#### CONTRA INDICATIONS

In pulmonary tuberculosis (7) of the evudative type lipiodol not only produces an immediate reaction but may reactivate a quescent lesion and its persistence in the lung may be attended with ill effects. These observations have been noted both clinically and experimentally. As a general rule patients with advanced broncho pulmonary diseases and recent hiemoptysis should not be injected.

#### DANGERS

Bronchoscopy in the hands of a gentle careful thoroughly trained bronchoscopist is practically devoid of danger (1). This has been frequently emphasized by Chevalier Jackson (12) and borne out by the large number of cases examined in his clinic.

To obtain a pneumonogram of real diagnostic value requires proper anæsthesia it is extremely difficult to carry out a satisfactory bronchoscopic examination and lipiodol injection without any occaine anæsthesia in patients who cough in



ce anti. This dru in a lafter a preliminary hypolerinic inject in a finosphi i indiatoj in is figre it value in elli fettole illaving irritating in hitempretiily. Othervie in imperfectly repir le pitents to had li diarach rea he the test of the fiscase but it is a replected by the

active cou h reflexes

But the actual vital dinger and the p werful that in of cain must exertle kept upper just in min! It must be used very cantifusly. Uni requately usual now we have not found any anosthetic who by local application has the value in leffect of execute.

Although at least 50 fet cent f the patients scallow same lipt of 1 a shown by the rengen ray no 18,00 ft librar bive feen found in any finy patients. Vigitated of Dr. Vichbald with an this success to tooline who developed tower simply may be to the che time of the most bine was upplied to the che time and on another when a line outtient was painted on the kin showed in all effects when bipodo mass injected sulcutancially and when at a later date it was 51 en to mouth. This patient was subsequently injected fronchoscopically with 17 cubic centimet is of hippodo without showing, and is in so foods in

Lipiodol may be injected with safety in chronic pulmontry suppurstion. It is extr mely drin gerous however to inject lipiodol or any other foreign liquid in the lung, when there is an isso-cited acute re-piritory infection or an acute exacellation of the chronic suppurstive process. In these cases the ill effects produced by lipiodol were the result of an a gravation of the under thing condition or a direct extension of the lesson.

In experimentally, produced pulmonary tuber culosis in rabbits. Harry Ballon (rol four list) the injection of lipin lol in these animals experilly when there was an asso lated acute point mone process was immediately followed by gave symptonis and ended frieth. In julmonary tubercules a quies ent lesion may be rate twitted by notifyed oil. Ignuer (ix) noted the appearance of tubercle bacilli in the sputum for the test time following the injection of voltage.

One of the late dangers which will have to be errou it considered is the confusion in dia noisy cursed by persi tent hypotol shadows and contineed gets will have to be on goard in the interfaction of the error that in other theory and the most presence of hips fol in the alveoli may resemble an unrest led pneumonia or an exidative or milter tuberculo is (7).

## PREPARATION OF THE LATIENT

I very patient to be injected with lipiodol should have a preliminary physical and rocalige rave examination. All jutients whether ambula to root boths idea are examined early in the morning on an empty stome has a voil ratchin, and

miting Meriha a alual 1 as a clatice for the ir ritating cough and atropin checks the profu e aheation Adult receive a hispodermic injecti n of 4 Lrain of morphia and 1 150 or 1 100 gritte of atroj in one hour before the local anas thetic is applied Patients with extremely irritable throats who you h inces antly and brin up on rmous quantities of flus are given another a grain of morphia hypodermically at the be innin of the local anasthetic Pantopon is substituted for morphia when the latter i not tolerated. In children between the age of 10 and 15 years graded doses of morphia are to be used. The preliminary hypodermic may be dispensed with in some latients who have previously been br mchoscoped

#### AN ENTILE TIZATION

All injections in my bronchoscol ic cress of 1 y patients ranging letween the specs of it and 6 y sears yet entried out under local and them (8). It is essential to any sheltze thoroughly the phartex hypopharyny and laren. For the purpo e the following myture is used o per cett solution of encrine hydrochloride 2 parts 1 1000 solution of afternalm chloride 2 parts.

In some patients it is of advantage to inject into the tracher with a larringeal synn e one half of a cubic centimeter of a nurture of equal

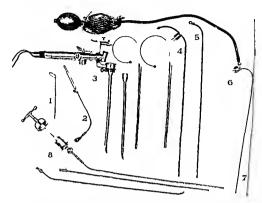


Fig. 2 Instruments required for broncho copic pneumono, aphy. I arynaed mirror 1 and camel hairb usl. for cocainization K hler letter broncho cope. 3 will be 10 and No. 8.7 tube for adults and clidden Clerfs. glasspecimen collect 1.4. Vipitating tube to be attached to portable a pirator 5. Cocaine ad enaling 17 yill equired 6. Opplicator 7. Ballon lipitodol injectin. 33. in e will tube attickled?

parts of 5 per cent eoeune with x 1000 adrenain chloride solution prior to the passing of the bronchoscope. This werker cocaine solution is also sprived into the trichea and bronchi after the bronchoscope is passed the spraving is done by a nurse or assistant. Topical applications of this mixture to the earma and brough are safer than spraying and therefore preferable.

#### INSTRUMENTS

The following instruments are required (1) For the preliminary occanization a Irvi ngeal mirror and a Irvi ngeal upplicator or camel s har brush (2) For the bronchoscopic examination abronchoscopic—Jackson Kahler Letter or Brun ing a portable aspirator with aspirating tubes sponge carriers for gauze sponges a Clerf's glass specimen collector and a cocaine spray (3) For the pneumonography Ballon's lipiodol syringe with tubes or any other suitable syringe

Any standard bronchoscope may be used for pneumonography depending largely on the experience of the examiner with a certain instrument. The author has used for this purpose the Kahler Leiter bronchoscope. Two tubes are required No. 8.5 for children and No. 10 for adults.

# DOS \CI

The quantity of lipiodol to be injected viries from ro to 40 cubic centimeters and is determined by the age size condition of the pittent the nature and extent of the lesion and the normal lung area requiring to be filled for contrist. In order to map out both lungs 25 to 30 cubic centimeters is usually sufficient.

#### TECHNIOUS

After the preliminary cocumization a rount genogram is taken the patient is then placed on the roentgen ray examining table in the dorsal decubitus position The usual ascette precentions are observed. The head is slightly they ited and extended and rests on the table the eyes and face remain uncovered the teeth in protected by a layer of gauze the bronchoscon over an alcohol flame is held in the ri ht hand and supported by the fingers of the left hin !the latter also protects the upper teeth in I bp then gently passed between the inesthetize cords into the tracher A cultur is falon *a Clerf's glass specimen collector the local 2 thetic is then sprayed or applied to the tr the main carina and bronchi to obta cough pus and secretion are aspirated f



trachea an I main Fronch in or let to permit of a Fetter I llin. A circful examination is now made f the area of the lung to be injected granulati in all present are removed for biopsy and lipi lol is then injected with any suitable syringe through the bronch scope into the different bronch under direct vision the nurse resistant slowly turning the piston of the syringe resistants slowly turning the piston of the syringe.

While the patient is being injected he can be





ig 5 Pentgengam In bhp i til tidi 3 t g tul ti htl iu d5 ub ce t m t flpod li ttebm !

turned either to the right or to the left side and so both halves of the lung are filled as with the patient in the dorsal decubitus the posterior part of the lung is chiefly outlined Fluoroscopic observations can also be made at this time this often affords an excellent means of localizin the lesion is soon as the injection is completed the bronchoscope is withdrawn the patient being cautioned not to cough and roentgeno rams taken in the supine prone semilateral lateral and sitting positions as the case may indicate When the patient has been thorou hly anasthe tized a series of roentgenograms can be taken in one instance a dozen were taken at interval of 4 minutes and studies made of the effect of posture respiratory movements and the could reflet Interoposterior views are taken with the head raised 45 degrees in order to permit the better filling of the lower lobes. The head is later low ered 45 degrees in order to observe whether the upper lobes would be better filled by chan e of posture Stereo copic pictures should al cars be taken immediately after the injection has been completed with the patient in the dorsal decubi tus or sitting position

The ad antage of the author's broncloscopic method as that the entire technique is carried out by the operator with the sole assistance of a mire t ained in bronchoscopy who hands instruments suction tube sponges and turns the piston of the liptodod synchronic.

In pulmonary tuberculosis only the di eased area is to be injected and the quantity limited to to 15 cubic centimeters. In cases of pulmonary tuberculosis, where the bronchoscopic examina

tion may be contra indicated the lipiodol can be injected by the transglottic method

The after care is confined to symptomatic treatment

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Lewel Lef re-excision. The crutery is to legic ferre. I for the excision because it seal a will sterilizes the eru hed intestinal surfaces.

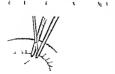
The last led and of the color is closel wh pur e tring niture of citigut re-enforced with ilk inverting the scaled stump. The lateral way caught in the rise of a trai ht clamping length e just to the diameter of the terminal dum The narrow strap protru ling through the jaws ! the clamy is lurned away with the cauter. This may be deme either in the longitudinal or traver e axis of the colon Mattress sutures of black ilk are now a local as shown in the illustrate a When the clamp are carefully withdrawn the parre w eru hed scaled parchment like strun e me I cether as the suture are to hiered and to I has line is re enf reed by another row f Lembert sulures of fine silk Traction upon II the sutures el ens up the stoma The mesen ters is now appreximated with interrupted silk

ters is now appreximated with interrupted six sutures.

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et as it is sometime called a complementar enter at my 1 inserting, a small rule the cate into the alean provinct to the anastorosis after the manner of Witzel and himman it out through a stall wound in the lateral abdomath will. If possible the anastono a nall site of the enterostomy are covered to omentum. The life saving and were dipolling, ungetion of Maio his proved in whathle increases in which the surgeon anticipates distention or paralleline.

Nothing is allowed 1x mouth or rectum for at least 4 days 5 are letter. Fluid (usually 1000 to 000 coulse centimeters of 25 per centiflator e) as given druk sul cutaneously or intrivenou last me convinced that the rest to the inter limit text is well worth the dicomfort it causes thou had to insure co-operation the patient must be prepared for it. The enterostomy tube can be removed in from 7 Last days and the same ckess spontaneously before the 1 attent layes the hospital usually in a week. In all of our eriese convalescence has been unmittering ted not even in a case complicated by tuberculous partionity valuere per situación.



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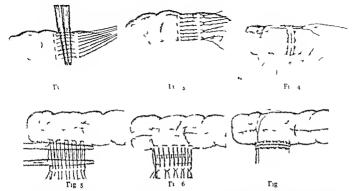


Fig. 2 The diseased portion of bowel has been removed The clamps a e approximating the ends which have been cut and sealed with the cautery Mattress sutures of silk have been inserted in practice much nearer to the clamps than indicated in the illustration

I is 3 Clamps have been removed showing the bowel ends crushed and scaled

Fig 4 First row of sutures tied the ends turned in and one of the s cond row of sutures introduced. These sutures for the purpose of illustration are drawn farther apart than they are actually inserted.

Γι_b S End to side anastomosis The lateral wall of the colon has been clamped and the portion which bulges through it has been burned away The ileum is bround into contact with it and mattress sutures are bein introduced

Fig 6 The clamps have ben removed brin ing into view the crushed side of the execum and the end of the ileum

Fig 7 Mattress sutures tied and one of the Lembert row being introduced. This completes the anastomosis (The ileum is d awn much too large)

# CHISPADIAS IN FEMALES AND ITS SURGICAL TREATMENTS

B DAVID W DAVIS WD R C ETF \FW YORK
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If is commonly stated in textbooks an lel can where that in the female epspadians is very rare condition a curiosity for the surge n which he must meet by genial improvisation if he be capable there is Suit is the literature ho ever disclose that quite a large number of cases has been reported for the most part singly and that while surgical improvisation has been lepended upon in the treatment of most of them it is now possible as a result of all this experience to formulate iclinite and well founded surgical principles. But ship they are the operations

performe I for this condition

The anal gy between epispadias in the female and epispadia in the male was hist recognized by Morpain in 555 (48). He ob ervelacise in a female 61 years f ag lescribed it accurately and published an excellent lrawing of it Similar cases had previ u ly been of screed but no one had seriously attempted an explanation of the condition or gi en it a name. This bit of keen observati n and accurate rea ming by Morpain deserves to be note! His a nelusi as h vever were doubte lan leven pros 11 many Most surgical vitters f hi day and f r s me time thereafter denied the existence of epispadias in the female Among these was Guyon hut later on when he had the opportunity of ob crying a case he admitted his error. This case if Guyon vas reported by Nunez in 188 (5) He al o discussed most f the case which had been ob served up to that time The classic monograph is that of Duran lin 1805 (17) Durand had no case of his own and his search of the literature was incomplete ince he referre it only o cases However from the e cases he can tructed a theory of the embryological origin and a classifi cation of the case into three groups classification has Leen generally accepted up to the present time In 1806 Ballantyne (7) pul lished another m n graph including a stuly of 33 ca es which he had found in a very thorough search of the lit rature. He follo is the classification of Durand and expresses rather pessimistic views concerning the advisability of surgical treatment Rasch in 180 (6 ) wrote a splen li l summary of the subject up to that date He also

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were published by Nove Josserand and Cotte (51) and Burckhardt (11)

Ideas which have been held concerning the embryological origin of epispadias in the male are well known to most urologists and the explanation of the condition in the female is undoubtedly the same \umerous theories have been advanced and discarded Among them may be mentioned that which holds that epispadias hypo padias exstrophy etc are due to rupture of the lower urmary tract following temporary occlusion of the urethra (10) that an inflammatory or some other pathological lesion of the lower abdominal wall and cloacal tubercle are respon sible that a rotation of the penis causes the urethra to he above the corpora cavernosa (20) that there is a retardation in the fusion of the cavernous bodie permitting the urethra to pass upward between them and that epispadias is due 1) a retardation in the development of the cloacal tubercle (78)

It present our views as stated by Johnson (33) are ba e I upon a purely embryological defect and the same explanation is given for both ex strophy of the bladder and epispadias the differ ence being merely one of degree There is a cephalad displacement of the cloacal membrane in an early stage of development before the cloacal tubercle has made its appearance The cloacal tu bercle developing later arises below the cloacal membrane so that when the membrane 1 re sorbed the uro-enital sinus opens on the dorsum of the phallus rather than on the ventrum If the displacement of the cloacal membrane extends on to the primitive abdominal wall the result will be exstrophy of the bladder of the displacement i of lesser degree epispadias alone results cording to this theory one should find cases howing all degrees of the deformity from complete exstrophy of the bladder on the one hand to a slight upward displacement of the urethral orifice on the other These gradations do exist in the female as in the male and lend support to this hypothesi

#### MORUMOLOGY

The majority of cases however correspond to quite a definite type and a shirt le cription of the type may I given at the point in the female the two labels of carpora caverna of the closed tubercle do not mate beneath the di

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placed urethra as they do in the male at any rate no such case has been found described in the literature unless it be that of Coustou (12) who simply states that the urethra opened above Instead the two halves of the ch toris which may be markedly underdeveloped remain separated by a considerable distance amounting to several centimeters in adult pa tients. Along with this separation, the anterior portions of the labia minora and labia majora also fail to unite so that a depressed area is left over the site usually occupied by the mons veners This depressed area is covered by a smooth glabrous hairless skin beneath which there may be a moderate amount of subcutaneous tissue and fat or the skin may be very closely applied to the anterior and inferior surfaces of the symphysis pubis. The labin minora are usually ill developed and terminate anteriorly at the corresponding half of the bifid clitoris where there may be a rudiment of the preputial fold. These external appearances are most characteristic. On separat ing the labia however one sees the urethra which may vary considerably in appearance. It may open between the two haves of the chtoris or some distance above them even anterior to the symphysis pubis or it may be represented by a wide funnel shaped opening sometimes large enough to fill the entire space between the two halves of the clitoris and the symphysis

The urethra is usually increased in diameter but this increase may vary between wide limits On probing the urethra with instrument or finger one may find the internal sphincter intact in which case there is no incontinence, the sphincter may be present but incompetent or there may be no sign whatever of it in which case it is usually possible to insert the finger directly into the bladder without resistance. Unless the internal sphincter be present and competent there is in continence of urine. In a number of cases the enlargement of the urethra has been so pro nounced that there is a hermation of the posterior wall of the bladder through the urethra either continually or upon coughing straining or merely standing erect. The bladder capacity is usually reduced as a result of habitual incontinence but the bladder is usually well formed and capable of dilating to its normal size. The symphysis pubis is usually closed. Early writers laid much stress on the state of the symphysis since they felt that if it were closed there could be no ques tion of bladder exstrophy while if it were open the condition present ought probably to be explained as a mild grade of exstrophy. It now appears that this distinction is of minor im

portance A study of Table I will show that in many cases the most extreme deformity of the urethra and aplasia of the sphincteric apparatus may occur in individuals without symphyseal defect while in the case of Sexton (70) a moderate degree of deformity with well developed sphincter and excellent urmary control was associated with a widely separated symphysis. This point is also illustrated by cases known as superior fissure of the bladder which might be described as an exstrophy of the bladder which is necessarily in complete owing to the presence of the symphysis pubis. The opening therefore is confined to the abdominal wall above the symphysis same way a tendency to deformity of the type of epispadias in the urethra and lower part of the bladder may be influenced by the presence or absence of a closed symphysis but it is obvious that it is not absolutely dependent thereon. The vagina and internal genitalia are usually normal though in Nove Josserand's case there was a double vagina. The hymen is usually circular The rectal sphincter is usually normal. Although in some cases a prolapse has been noted in many of these cases surgical treatment of the deformity by doing away with the pain and straining conse quent upon irritation of the parts by decomposed urine has caused the prolapse to disappear

## INCONTINENCE

Incontinence of urine is the rule and is usually complete or nearly so The principal exception to this rule is in those cases in which the deformity is of the first degree—the vestibular epispadias of Durand If the internal sphincter is unaffected and normal urmary control is present. In a few cases control is almost but not quite normal there being a slight frequency slight urgency perhaps even slight leakage on unusual straining or exerci e The case of Sexton represents this With those suffering with a greater degree of in continence it is particularly to be noted that some of them have been able to control the urine to a certain extent while lying in bed with complete incontinence while sitting standing or walk ing In other cases incontinence is complete in the lying position while if the patient sits or stands the unne may be retained for a short time In a considerable proportion of these latter cases it has been noted that there is herniation or prolapse of the posterior bladder wall while the patient is standing. The author feels that the first group of patients represents those in whom a radiment of sphincter is present, which is able to withhold the urine when the intra abdominal pressure is reduced as much as possible, but not

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when it is increased by the erect position while in the second group of cases the comparative continence evisting while the patient is erect is not due to the presence of any sphineter but to the plugging of the urethral opening by the hermated posterior bladder wall. The observation of Surmay (7) supports this view. He noted in his patient a girl of 1.4 that the bladder mucosa was prolapsed through the urethral orifice looking like half a cherry and that when a finger was in serted and the plug of mucosa pushed back. The sush of urine from the bladder was produced a

The degree of incompetence of the vesical sphinicter does not necessarily depend on the degree of the external deformity. In Morpann's case the urethra was very large but continence was present while in a number of other cases there was complete incontinence the urethrabeing only moderately larger than normal. The incontinence is very often associated with marked inflammation of the skin of the vulva and sur rounding parts due to ammonical decomposition of the urine with which they are constantly wet. This may be absent in cases in which there is even partial control or in which the patient has ever cised unusually great care in keeping clean.

#### ATYPICAL CASES

Interesting sidelights on the nature of this de formity may be obtained from a study of certain atypical cases Six of the cases here tabulated differ markedly from the usual form. The case of Tipjakow illustrates a variation in which there is lateral asymmetry Here the urethra was above and to the right of the clitoris and the right labium minus ended anteriorly at the edge of the vesical orifice. The clitoris was described as be ing single and lying below and to the left of the urethral orifice where its relations with the left labium minus were normal. It seems likely that there was really a bifid clitoris the left half of which was much better developed than the right In this case there was comparatively good control of urine until after marriage when some incontinence commenced One wonders whether this may not have been due to abnormal sexual intercourse which might easily occur because of the large urethral orifice

The case of Testelin is quite unique. Here the external picture was perfectly characteristic of epispadias the description being that the anterior commissure of the vagina was absent there was a gutter over the pubis and a large pouring orifice above the clitoris which was single but attached to only one labium minus recalling the situation in the case of Inpytkow. Below the

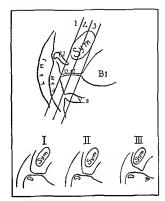
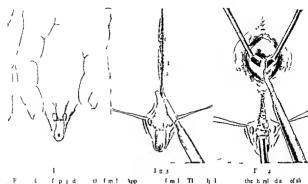


Fig. Diagram shown. Durand's classification of epi padia in the female I The estibular zone II The subsymphy cal zone III The retrosymphyseal one I The fit or vestibular degree of epispadia in which the uterthraily practically normal but its relations to the clitton are altered z the second or sub-ymphyseal degree of epispadia in which there is a defect in the ante io all of the u eth a for about 0 e hall its lengtl z the third or retro-ymphyseal degree of epi padias with defect of the anterior wall of the entire urethra. The phincter may or may not be involved.

chtoris however was a second orifice which had the appearance of a normal urethra. On passing sounds through these orifices it was found that each communicated with the bladder by a separate channel the lower 6 centimeters long the upper 4 centimeters long Cauterization of the upper and abnormal orifice with secondary suture finally resulted in its obliteration. The patient then had perfect control of unnation through the lower urethra It is very interesting to speculate on the embryological origin of this strange de formity One might imagine that the urogenital membrane has suffered an upward displacement of such slight degree that the cloacal tubercle arose in divided form directly to either side of it and as it developed divided in two the lowermost portion of the urethrovesical anlage (the uro genital sinus)

The cases of Penchiennati Moeller and Furst may be considered together. Unfortunately the description of Penchiennati's case leaves much to be desired. There was a good sized tumor over the pubic bones covered with common tegu.



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ment which seems to rule out exstrophy There were two orifices both discharged urine one in the midline at the upper border of the tumor and another one slightly to one side of the midline at the lower border of the tumor almost at the nor mal ite of the urethra. The symphysis was cleft the vagina normal. The patient ched at the age of a years and an aut psy was performed but this was so incomplete and reported so badly that one cannot be sure hat the internal arrange ments were. It seems m st likely that the upper ortfice represented a patent urachus while the lower one was an epi padiac urethra Moeller's case is similar except that there was no urachal opening. The symphysis was separated and there as a hernia of the lower abdominal all contain

ing the bladder v linch was however entirely closed on its anterior aspect. Inferior to this herma vas a unterhal oritice which had an appear ance correspon ling exactly with the typical epis padias just describe! Thi case gives strong additional evidence that even where there is a tend ency to fullty development of the lower urmary tract a separation of the simply is does not necessarily mean that there will be existophy. In Furst scase it is not lefinitely stated that the symphysis wa open but one feels that it must have been. There was no definite herma of the

anterna abdominal wall but there was a urachal fistula a red streak ran from the urachal fistula to the urethra the labia were separated anteriorly and the clitter was bird. In spite of all this evidence of faulty development of the lower uranary tract the sphincter vas evidently well formed since after closure of the urachal fit under was no in intense through the urethra

Unfortunately the case of Judion vas de scribed so imperfectly that one cannot be certain as to whether or not it represents an atypical mal formation in a premature infant. It is stated that there was a large quadrilateral urethral ontice that the charts was entirely mis in and that there was some separation of the symphys. It is possible that a more complete de cription would place this case among the typical cases of ensordias.

#### CL VSSIFIC VIION

In con idering such cases as tho e just de scribed and other cases of atypical and incomplete extrophy of the bladder it is evident that a nomenclature and delimitation of various groups must be established. Where does epi padas leave off and existrophy begin? Older writers have attempted to hay don in the right that all cases in which the symphysis is closed must be re arded

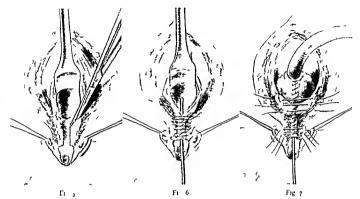


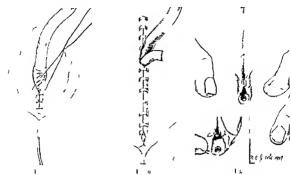
Fig 5 Tle symphysi has been divided and the entire bladder and urethra have been laid open. Piece of mucosa a e bei ge c cellaterally leaving just enough for a normal ized uretl a Note the relation of the new urethra to the ureters and the inter ureteric har

Γ g 6 The new urethra reconstructed with continuous

Fig 7 The reconstruction is complete. The symphysis sutured with No 3 chromic catgut. The halves of the chtoris are d awn together with plain catgut sutures.

as epispadias while if the symphysis is open one is really dealing with mild grades of exstrophy This dictum is certainly untenable since no one would think of applying the name of exstrophy to the cases of Moeller Purst or Sexton To meet this difficulty. Durand devised an entirely new term critrotersion which was applied to those cases in which the urethral defect was extensive the sphincter undeveloped and the bladder mucosa prolapsed. In the interest of simplicity however it would seem advisable not to multiply the terms in use and the name epis padias can be applied perfectly reasonably and understandably to all cases in which there is no open cleft at any point in the anterior wall of the bladder just as in the male We can then dis tinguish groups of epispadias Durand formu lated three groups. He considered that there were three zones first the vestibular zone bounded by a line tangential to the anterior sur face of the symphysis and passing through the urethral meatus second a subsymphyseal zone extending between the line just mentioned and a line drawn between the middle of the symphysis and the midpoint of the urethra third the retro symphyseal zone including the tissue between the last named line and a line parallel to it pas ing through the vesical orifice. Thus if the deformity is confined to the vestibular zone one has the first degree of epispadias consisting only of a division of the clitoris and an upward displacement of the urethral orifice With this type there should be no incontinence. In the second degree the deformity extends into the subsymphyseal zone with a defective anterior surface of the urethra here giving rise to a wide funnel shaped orifice but again the sphincteric apparatus should not be involved and urinary control should be pres ent In the third degree the defect in the ante rior wall of the urethra extends back into the retrosymphy eal zone usually involving to a greater or lesser extent the internal sphincter of the bladder with resultant incontinence. When the sphincter is greatly involved in the deformity and the vesical orifice much widened there may be prolapse of the posterior wall of the bladder

A careful study of the case reports accompanying this article will show that Durand's classification is somewhat too dogmatic since incontinence may be present with slight degrees of urcthral deformity while in other cases excellent urinary control may exist along with extreme urcthral deformity. The classification however has some usefulness from an anatomical point of yiew but



fr ma ureal putt free it cens to me that ther hull feltet two grup namely epigliss vid at me at none in Applich with an itinen college place the method to the me the property vide in entirence though dipting so the file of the exact to the among a grade of the extent for the fronts.

Lalle I gives the anat micil le cristi n far as it may be glein lift in the literature of the cae which have been reperted 1 or ther ith an acc unt if the treatm nt employe land the re ults I tained Analy t I the Ial le shows that it include by he which tre un loubtedly typical egigibits. In 5 f the c th re as no inc ntin ncc laving i cales f typi al epis palia with in intinine Six of the cases are clas el a ityi cal while to must be liste l'as questi nal le sin t fiults or in implete de scriptin but neach of these there is a me good reason t I chove that 1 ca e of true epi padias is reprented If we include the e pr bable cases there i a t til foo cases of typical epispadias with inc itin ice. These Igures indicate that the conditi v hil rare 1 not one of the great currositie and that it is theref re worth while for every ur | 10.31 surgeon to know how to procee is should a case come to his attention. The following report is an account of a case een ly the author

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down on each side to the ba es of the plit glans of the cliton. From there the incisions turned inward to the anterior asy ect of the enlarged urethral orifice thus includ ing in the rhomboidal race designed for ever ion practi ally all of the abnorm I hairle's skin occupying the depre ed area at the ate of the mons venera and anterior commissure Dis ection was then carried dos n to the blad der above the ymphysi the peritoneum pushed back an I the bladder inci ed. With retractors in I lace one could ee that the ve ical muco a vas smooth pale and normal in appear nce in all particulars except that the urethral orifice was dilated Clear urine flowe I from the urcter The bl dder all was of normal thickn as and appeared to be vell muscled. The rhomboidal flap at the lower end of the in 1 ion vas then dis ected off and retracted down and the inci ion car ied down on the urethra and symphysi The cartilaginous symphysis was divided and the urethra split all the way up to the bladder so that the enti e tract i as laid open. In pection then showed that the urethra y as all out 30 millimeters in circumference and that there was no line of demarcation between urethra and bladder No trans er e folds or band vere een

A point was selected corre ponding by its relations it it to ureted all orifices to the tivula of I beutand and the urethral mucous membrane exceed on both it to up to the level of this point I take in a strip about 7 m limeters wide and it millimeter long with parallel edge form with the new uretra was to be formed Incisions e e then carried obliquely up and on each lide to the cut edge of the bladder completing the exist non fredundant muco a Martery apparently the infer or ve cal was encountered on each side and clamped and ligated In jection then shoved ome masse of muscle on eitler side of the site of the rew orifice. The exerce deeply caught up with a suture

I No othrom catgut high fame out just at the edge it he mucous membrane. When this suture was drawn together it created a new and small vesscal orifice sur rounded by a good mas of muscle which y as cup cted to ha ea ph neter action. The same strand a sa u ed a dien eu ireth a reco structed by a cont mous stitch with milar deep bites doo n to the external orifice. It as then I rought lack making a geond row bu jung the

n's urethra and tied at the le of the second confice Moother continuous No o bromic cativat uture doe et the bladder e cept at the upper ent of the incision whice a large bladder dramage tube was left in place. The symphysis was brought together with 4 No 3 chromic cat gut utures. Closure of the shin for the short dit times from the new urethra to the clitons was by No o plan catignt te rupted utures the two brides of the cliton being the hought together. The remainder of the time ion was closed in the usual vay metal clup being ue do to teshin. The suturing of the urethra was done over a if er probe and at the end it vas tight enough to grasp the pobe mode ately. The probe was withdrawn at the completion of the op atton.

Rather marked bleeding began 36 lour after the operation lut lasted only a hort time and apparently hid the patient little harm. One small tansfusion vas gi en. The tule varenessed from the bladder on the twenty fit day. The pitent was dicharged from the ke pital on bp. if § 15 much as 120 cubic centimeters could be voided at a time but di bibling, was more or le cont mouse.

Ju e 23 Tl c patient could od about one half cupful even momming a devening but it re as a till ome d le ling. No e zema vas pre ent. Under an esthe ia eva miniat on how I the entire oun I to be ellheatelde cept the the hale of the clitori we e 7 or 8 millimet rs apart. The urett ral onice appeared normal and no u ne leaked from it \ No 0.1 catheter enterel the bladder w thout

difficulty and clear urine was withdrawn. There was no leakage around the catheter when i o cubic centimeter of fluid were injected.

September 7 Since the previous examination no leak age of urine fad occurred at any time day or night in pite of a exercitatek of I conclut 6 weeks lefe c. The usual internal of voidin with 1/2 to 3 hours durin the day and the maximum inter all va. (/ hours. The clull usually slept no to 1/2 hour at in it without ools; St. The urine was clear on examination. The patient had gained tremendoul by in exery way.

## TRUATMI NT

For purposes of discussion the methods that have been followed in treating epispidins in the female may be classified as (1) plastic operations () reefing operations (1) muscle transplantation (4) torsion of the urettra (5) cauterization (6) interposition of uterus (7) transplantation of the ureters and (8) closure of urethra with establish ment of suprapubic fistula

1 Plastic operations These may be divided into (a) external plastics in which the external genutalia have been restored to a condition as near normal as possible and the urethra has been repured by the excision of portions of its re dundant wall reaching upward for variable dis tances but not far enough to include the sphine teric muscle of the bladder and (b) internal plastics in which the repair has been carried up ward to include the region of the internal sphine ter the vesical orifice and a portion of the anterior wall of the bladder Many of the carly cases were operated upon by the external plastic method because of a lack of understanding of the internal situation causing incontinence and merely with the thought of restoring the external appear

In later developments the idea appeared that the necessary requirement was lengthening and narrowing of the urethra followed later by efforts to create a ben l or kink in its course Surprisingly enough 5 of the cases operated upon in this manner are reported as complete cures It should however be stated at this point that reports of complete cures un accompanied by specific statements covering a long period of obser vation after the operation should be accepted with much re erve. For example one case (No. 30) was reported by Alexander in 180 as a complete cure. The same case was observed by Ballantyne 3 year later and at that time the incontinence had returned and was complete. It is noted in many cases that while the immediate result may be good inconlinence will return a few weeks later as a result of the subsidence of the cedema and inflammatory reaction around the urethra

TABLE II - CLASSIFICATION OF OPERATIVE PROCEDURES USED FOR FPISHADIAS IN PENALTY IND DECILITE ORTHORS*

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Recting operations In another group of cases restoration of the urethra was attempted by means of reefing sutures applied through its walls reducing the caliber without any exciton of ti sue I ractically all of these attempts failed since they violated a fundamental surgical prin ciple in aiming to cau e the cohesion of mucous surfaces in apposition by means of sutures. Here again the areas covered varied widely in some cases including only the external portion of the urethra and in others including the entire urethra and sphincteric apparatus

Muscle plastic operations Some surgeons feeling that the faulty development of the mus cular apparatus precludes any successful attempt to restore normal conditions by plastic opera tion have attempted to supply new sphincteric apparatus by transplanting a voluntary muscle in the form of a ring around the urethra In some cases there was previous reduction in size of the urethra by plastic procedures in other none The muscles used have been the pyra midalis muscle brought dov neither vith or vith out a strip of rectus fascia attached Lehind the symphysis to the juxtavesical portion of the urethra strips of rectus muscle brou ht down either behind or in front of the symphysis to sur round the urethra and the gracilis mu cle divided at its midpoint and brought across into the peri

neum to surround the urethra Some good results have been obtained from each of these methods

A Torsion of the wrethra This operation repre sents an effort to bring the walls of the urethra into close apposition by another means ure thra is freed up to its attachment to the blad der twisted through an arc varying from oo to 480 degrees the latter in several sittings and sutured into place again at the outer end This operation has had a great vogue not only in epis nadias but in traumatic incontinence of women but has many disadvantages It may be followed by gangrene of the urethra or stricture and in many cases has failed to produce the desired re

5 Canters atton This method has been used but twice once to cause obliteration of an acces sory urethral canal (Case 7) and again in an effort to reduce the caliber of an epi padiac urethra. In the latter case it failed completely as might have

been expected

6 Interposition of uterus This operation has been utilized but once At the same time the vesicovaginal fascia was shortened by a reefing procedure and the patient was sterilized by a re section of the tubes. The result was good but there now seems no excuse for sterilizing the patient in order to cure epispadias

Transplantation of the urcters The many failures following plastic and other direct opera tions have induced two surgeons to attempt trans plantation of the ureters into the rectosirmoid The results have been good in all of the cases reported but here again in the light of considera tions to be discussed later it seems that the procedure is unnecessarily severe and radical

Obliteration of wrethra and establishment of suprapubic fistula This operation which is truly a counsel of despair has been done in 2 cases but requires no further consideration at this time

Apparently the first operation for epispadias in the female was performed by Roeser in 1860 He excised portions of skin externally so that the halves of the clitoris and the upper parts of the labia could be drawn together. He also excised some of the redundant urethra but only for a portion of its length. As a result of this operation the patient's condition was improved but there was still leakage on coughing or straining and at night

Pippingskold was the next to operate in 1876 but no description of the operation is given and there was no improvement in the incontinence Moericke in 1880 made a marked advance After four unsuccessful external plastics he dissected the urethra deep into the bladder including the

region of the sphincter and sutured the edges of the resected area together. He also lengthened the urethra and kinked it up over the symphysis The result was somewhat better The patient could retain urine for 4 hours but there was still a little leakage on coughing or straining. In the case of Frommel in 1882 a similar operation was performed and the statement was made that the patient could retain the urine for 4 hours without any leakage If this is true it is the first instance of a cure of epispadias in the female

There were no further innovations until Ger sunv in 1880 conceived the idea of twisting the urethra on its long axis to bring its walls in close apposition In his case he twisted the urethra in sittings through 450 degrees after which the patient could retain urine for s hours and did not leak but had marked difficulty of urination taking 4 minutes to empty the bladder Van der Hoeven in the same year excised the entire urethra forming a new one by a plastic procedure from viginal mucosa with what is stated to be a

rood result

Himmelfarb in 1893 followed an entirely new plan His incision was made in the vagina and through this opening he resected an oval piece from the region of the vesical orifice posteriorly without cutting through the mucosa The edges of this resected area presumably made up of mus cular tissue were then sutured together. The urethra was also lengthened and the result was apparently very satisfactory the patient being able to retain the urine for 6 hours without any leakage o months after the operation Similar operations are still done for traumatic inconti nence in women and with success but in epis padias the defect is anterior and the resection and repair should be done anteriorly

Alexander in 1892 was the first to attempt nar rowing of the urethra by means of reefing sutures In spite of a repetition of the procedure the fail ure was complete Von Mayersbach in 1008 seems to have been the first to suggest strengthen ing the sphincter by transplantation of voluntary muscle but he used for this purpose some fibers of the constrictor vaginæ which could scarcely be expected to be satisfactory for this purpose

The first practicable contribution on the basis of muscle transplantation was that of Goebell in 1010 He brought the pyramidalis muscles down behind the symphysis pubis and sutured them together beneath the urethra The results were good This operation was cleverly devised and took advantage of the fact that the nerve and blood supply of the pyramidalis muscle enter it very near its point of origin and need not be disturbed by the operation Unfortunately the pyramidalis is often poorly developed so that a number of surgeons who have attempted this operation have not found sufficient material with which to carry it out. The rifes was further extended by Thompson in 1923 who finding the pyramidali dehicient cut a long strip from the rectus abdominalis and brought it down in front of the symphysis split its end longitudinally and ewel these halves around the urethry. Some of the operations which mike use of the pyramidalis muscles have failed probably because of the poor development of the muscle or because of unintentional interference with its nerve or blood supply at the time of operations.

In 1917 Stiles concluded from a study of the literature that all of the operations to date might be expected to fail and therefore treated his cases by transplanting the ureters into the recto sigmoid Wertheim in 1916 after numerous efforts to help hi case by other means including injections of fat and parafilm did a complicated operation in which the uterus was tipped forward and interposed beneath the region of the vesseal ornice. While this apparently produced a good ornice. While this apparently produced a good result it made sterilization of the patient neces sary and has not been imitated by any other surgeon.

It is remarkable that in not one of the cases operated upon up to 1923 is there any mention of a diver ion of the urine hy means of a drain ane tube in the bladder. In some cases the pa tients were left to pass their urine over the freshly sutured field of operation and in others a reten tion catheter was left in place for a certain length of time. This seems remarkable masmuch as other surgeons who had been operating upon urethral defects in the male particularly hypo spadias had long before this discovered that di ersion of the urine is absolutely necessary in order to secure healing in a sufficiently large pro portion of the cases Apparently the first to put this principle into practice in a case of female epispadias v as Young who performed his opera tion in 10 3 This operation is of particular inter est from several points of view. The surgeon through his previous vork on male epispadias as familiar with the studies of von Kalischer

and Zangemeister who showed that in cases of male epispadias the internal sphincter muscle exusts as a crescentic mass with its convertly posterior and anterior ends being ununited because of a defect in the anterior wall of the vesical orifice. He therefore deliberately planned to freshen the end of this muscle excise the redundant mucosa between them and suture them.

together around the newly formed vesical orane. In order to do this properly he made a wide er posure of the entire bladder and urethin Since the patient was only 5 years old he cut through the critilaginous symphosis and thereby obtained a perfect view of the situation. The resection of the urethra and vessel orafice vas vide leavin just enough mucosa for the reconstruction. A draining tube was placed in the bladder to divert the urine during the period of health and the result was entirely satisfactory, the patient being free of incontinence.

About the same time Deming operated upon a patient 21 years of age. The operation upon the vesical orifice was done as a separate ster but bladder draining was also used. Owing either to the scars of previous operations to unusually great aplasia of the splinger or to some other factor the result was not successful so that he had recourse to a muscle plastic using the gracilis muscle This idea was quite original with Deming and has much to recommend it. The gracilis muscle is larger than any of the other muscles that have been used for the purpose it is not apt to be undeveloped a sufficient len that always available and the blood and nerve supply are so arranged that they are not interfered with if the muscle is cut in its midportion and its upper half carried up into the perineum. This procedure was followed by complete success and has since been successfully repeated by Player and Callen dar (50) in a case of male incontinence

Lowsley case is an unusual one The situation as far as the sphincter muscle and urethra were concerned was the same as in cases of eni pa has but he states that there was no almormality a hat soever of the external genitalia. His plan of operation was similar to that of Youn but since his patient vas S vears of are it was not neces sary to divide the symphysis in order to obtain suitable exposure The re ult was entirely suc cessful In the case reported in this article the method followed was essentially similar to that of Young There vere slight differences in the trace of the cutaneous inci ion with the idea of producing a better cosmetic result in the region of the anterior commissure \o instrument \ as left in the urethra at the close of the operation but bladder drunage was establi hed It was further found that silver wires were unnecessary for closure of the symphysis chromic cat ut sutures proving satisfactory

# SUMMIRI

In the light of the foregoing considerations it appears obvious that there is no occusion for pessimism as to the results of plastic operations for epispadias in the female. In practically every case in which the surgical procedures have been properly planned and executed complete success has been attained Such operations as trans plantation of the u eters should therefore be entirely abandoned for this condition Even though a satisfactory functional result may be obtained it is unne essary to subject the patient to the risk of ascending renal infection which is always present after this operation Gersuny's operation of torsion of the urethra should also be abandone l not only in cases of epispadias but for all cases of female incontinence. The evil re sults from it are too numerous and include gan grene of the urethra urethral stricture urethro cele with stone formation and urethrovaginal fistula while even in the absence of these there are reports of failure to relieve the incontinence In a case known to the author a retention of urine followed a Gersuny operation and the urethral orifice could not be located when catheterization was attempted. As a result false passages were produced and the patient's condition made worse than before

The method to be followed is obvious should consist of two steps only the second of which is usually unnecessary. The first should be a thoroughgoing plastic repair of the defect in cluding the following essential points (1) Wide exposure of the affected areas ( ) Sufficient and thoroughly controlled excision of excessive mu cosa done under vision. It is very important to make the urethra small enough if it is too small it can easily be dilated if it is too large the opera tion is a failure and must be repeated (3) Care ful suture of the halves of the defective internal sphincter muscle over the anterior aspect of the newly formed vesical orifice (4) Diversion of the urine during the period of healing by a dramage tube in the bladder This procedure can be relied upon to produce a cure in most cases in which it is properly carried out. Should it for any reason fail the second stage should then be the per formance of Deming's gracilis muscle plastic operation There is excellent reason to believe that these methods can be relied upon to produce a cure in practically every case of epispadias in the female

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# THE TREATMENT OF CONGENITAL DISLOCATION OF THE HIP BY OPEN OPERATION¹

By W RUSSFLL MacAUSLAND M D Bosto S g Ch f O th ped D I time t C y H pt l

IN the treatment of congenital dislocation of the hip operative interference presents eer tain advantages over mechanical and closed manipulative methods-advantages that justify a more extensive use of the open procedure Operative treatment affords the opportunity to examine the existing pathology. Not infrequent ly the study of the pathological changes reveals a dislocation so marked or a capsule so misshapen or an acetabulum so filled with adherent tissue that the impossibility of obtaining reduction by closed manipulative treatment is immediately recognized The surgical dangers of open opera tion are very slight shock is seldom experienced and there is little damage to the tissues. On the other hand so much force may be required to reduce a dislocation by manual procedures or traction machines that the soft parts are severely traumatized Open intervention is the only procedure possible in adult cases of dislocation which unless relieved come to extreme dis ability since the patient suffers from symptoms of an arthritic nature as well as from instability

The hesitancy of operators to use the open method more widel, may be traced to the conservative teachings of many of our instructors. Then too manipulative procedures have been practised so long in many of the children's hospitals that the adoption of the open method might be interpreted as an admission of the fullure of the closed manipulative measures. To those who have been trained recently in sur gical procedure, and who have learned the technique of the open approach is fogical.

#### INDICATIONS

In children from 4 to 8 years of age operative interference is indicated to effect reduction when one or two closed manipulations have not been successful

In children more than 8 years of age and in dolescents open operation is the method of choice for reducing a dislocation. Manipulative treatment in such cases is hable to result in extensive trauma especially is this true if the child is of the resistant type.

In adults whose age excludes the possibility of obtaining a satisfactory functional result open

operation is indicated to correct deformity if present and to relieve pain and stiffness thereby avoiding arthritic complications which eventually develop in such cases

#### PATHOLOGY

The chief obstacles to reduction lie in the alteration of the soft structures and in the anteversion of the femoral head and neck. In some cases changes in the acetabulum make reduction difficult

The superior capsule is extremely diluted as the result of the pressure of the femoral head against it when the patient bears weight. The inferior capsule is adherent to the acetabulum and often fills the cavity except for a small opening through which the teres ligament passes to join the head. At the upper posterior rim of the acetabulum where the teres ligament comes out the capsule is usually contracted in the shape of an hour glass. This contraction of the inferior capsule and its adherence to the acetabulum form the great barriers to reduction by closed manipulative methods.

The femoral head and neck practically always show anteversion and not infrequently the neck is shortened and misshapian as well as twisted. This rotation of the head and neck constitutes another obstacle to reduction.

The acetabulum assumes a triangular shape. Its rim becomes flattened as the result of the pull of the capsule upwird. The socket appears to be shullow. In some cases the cavity actually may be of little depth, but as a rule, the shallow appearance is due to the fact that the acetab ulum is filled with connective tissue which is completely covered over by the adherent inferior cansule.

#### OPERATIVE TREATMENT

The selection of the operation Once open operation has been decided upon the choice of the operative method will be determined by the following frictors the age of the patient the position of the femoral head and the pathological condition of the acetabulum The operator may advise a simple replacement of the femoral head a reconstruction operation on the acetabulum of head or an arthrodesis



lg (gilh; ld(th)

Simple replacement the iteal method of treatment for it insures both a good anatomical and functional recovery. This procedure is equipherable to cross in which the actabulum is of sufficient depth to return the femoral head and in which the shape of the head itself in mind cruently so. The technique his which the head is restored to pistion varies with the operator. If marked internal rotation persists after reduction it may be corrected by an osteo tomy of the femur.

The such method freduct in A 2 day preparation 1 given to the operative held which in ludes the knee 1 into the inner and posterior jarts of the thirds up to the given and the section continued letwen the anterior midline and the potent is million of the body and extending well at the crest of the illum. The pittent is driped with the affected leg left exposed is a so to a little manipulative treatment.

An incisi n 6 to 8 inches in length is made beginning at the anterior superior spine and extending downward in a slightly curved direction to the outer part of the thigh The skin ed es are wine I with alcehol and walled off with t wels. A len itudinal incision i made through the fascia care lung taken in the carry at too low because of the dan or of injuring the internal saphen us nerve leading to the vistus externus The ext rnal fem ral arters, which usually hes in the lower part of the wound is clamped off and tied. The rectus fem ris and the sartorius are defined and retracte 1 to the inner side and the tensor vagine femoris and the gluteus max imus and medius are exposed and retracted to the outer side. All tissue about the capsule is pushed back by blunt dis ceti n

An incision running parallel to the shaft of the femur is mile through the capsule and lengthened at each end by means of heavy scissor. The city ule is examined for constrictions. The hour glass contraction usually found between the femoral head and the acetabulum is divided. The capsule i forcibly dilated to expo e the head of the femur. Sutures are placed in each side of the capsule in order to facilitate suturing when reduction has been made.

The joint cavity is explored with the index inger. The fem ral head is usually found in a high posterior position. The teres ligament is



located and will be fund to lead to the diacetabulum. Any ol stacle to reduction is over come the inferior cripsule is cleared away from the acetabulum with a chi el and all soft usue is removed from the cavity. O casionally it is necessary to ever the attachments of the pectinal muscles on the inner side of the future. If the teres ligrament is thickened it should be extent

Reduction of the head is now of trined by a combination of al luction and internal rotation movements A special instrument the con eni tal hip skid devised by the writer (Fi 1) is placed under the femoral heal with its hip extending just inside the superior rim of the acetabulum. The operator pushe on the tro chanter and at the same time lifts the skid to secure leverage while an assistant brin s the le into abduction strong inward rotation and Considerable invertion i re hyperextension quired to force the head into proper apposition with the acetabulum. When the femoral head reaches the cauty it snaps into place. It i locked securely in position 13 further abduction and mward rotation of the head

The capsul is overlying and in the chrome gut sutures are tiel securely. The muscles fall back into place the operator using a cat of suture to prevent blind pockets. The fact a closed with continuous chromic citigut and the skin with continuous citigut. A plaster spica i applied from the brist line to the ankle with the hip in abduction and inward rotation and with the knee flexed (Fig.).



Fig. 3. Cale i Poentgenogram showing the femoral leading of ition after operation

The spica is worn for 8 weeks. At the end of this period a new one is applied with the hip in 15 degrees to o degrees abduction and in marked inward rotation with the knee extended. A plaster spica is used to maintain the hip in position for 6 to 10 weeks depending upon the stability and the mechanical problem involved.

Ifter care When the plaster spica has been removed the hip thigh and calf should be massaged and put through prissive movements daily. The patient should be taught to walk properly with the feet straight ahead to fivor the return of muscle balance. Swimming is the well form of exercise.

Osteolomy of the femur In an occasional case the internal rotation may be so marked as to require an osteotomy of the femur This procedure is often necessary in cases of older patients. It should not be performed until motion in the line is well established.

The technique of osteotomy of the femur is as follows. The femur is exposed through an incision 3 to 4 inches long made just below the trochanter. A longitudinal incision about 1½ inches in length is made in the periosteum. A transverse osteotomy is done and the lower part of the femur is rotated outward until the loot in recumbency points directly upward. The periosteum is sutured and the wound closed in the usual manner. A plaster spica is applied and worn for 8 to 10 weeks. Weight bearing is permitted during the latter part of this period.

Reconstruction operations: The object of a reconstruction operation is stribility to the hip so that it can support the weight of the body without pain and second to price are motion sufficient for ordinary movements.



lig 4 Case loentgeno am no ving t enght fem ord head in position neally 1 year after open operation and the left femoral head in position nearly 11 years ofter manualation.

Reconstruction operations are used in cases in which a permanent reduction cannot be insured because of the extreme hypermobility of the hip joint due to the shillowness of the actabulum or to the distortion of the femoral head Reconstruction methods are also applicable to croses in which an attempt at reduction is useless either because of the advanced age of the patient or because of severe structural changes such as extreme alteration of the tissues a great amount of shortening or elevation of the hip. The best known methods of reconstruction are, the bone flap method of Albee (i) and the bifurcation method for Lorenz (18) and you Bayer (5).

Ranforcement of the acetabulum following reduction. The femoral head is reduced by the author's method. A curved shelf of bone about 1½ inches wide and 4 or 5 inches long is raised from the outer table of the ilium behind and just above the firmoral head. This bone flap is bent downward gradually until it projects out ward at a right angle to the ilium. The shelf thus formed may be reinforced with a bone graft or chips of bone. This widge acts as an obstacle to the recurrence of dislocation. The wound is closed and a plaster spice applied from the toes to the nupple line, with the leg abducted to about 30 degrees.

The formation of a new a clabilium in 11rd du the cases. This method may be used in cases in which an attempt at complete reduction would cause extensive trauma. Operators differ as to the selection of the site for the construction of the new acctabulum. Albee (1) forms a new socket on the illum higher up than the original



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acetabulum Gill (5) begin the nev cavity at the 1te of the old acetabulum and continues the enlargement upward until the head can be placed in it flatens eig (3) forms a new ocket in the upper half of the old acetabulum Speed (53) determines the level of the new cavit by brin me the fem ral h a linto position by ab lutting the this heaving, it is about 60 degree and marking, the place vhere the head rests on the litum. A new speket is formed at this point.

The formation of a supporting shelf of bonuntil at a new tong an wazetabulum on order
to the tentral rag an wazetabulum on order
to the tentral rag and wazetabulum on a subject for the femoral head. The creation of a
smooth gli ling surface for the head by the same
technique as le cribed under The reinforcement
of the actabulum tillowing reduction in reases
stability relieves pain and thereby improves
function. This method is applicable particularly

The bifn att i mith if for n (3) and son Bave (3) iii i ic ble a es. This procedure consists of an oblique osteotomy of the femur just below the trochanter and the insertion of the pr umal end of the lower fragment into the acetabular socket where it rests again the femoral heal. When properly done this operation give good results

to adult cases

1/11/odesis In adult cases in which there is instability stiffness pain and deformity arthrodesis is indicated to relieve the symptoms. A hip and love of in good position is preferable to one that is un-table and prinful

# CASES OF REDUCTION

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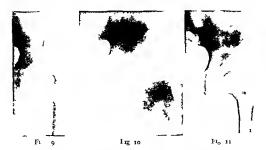
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(Fig 8) ho dth hip t bei g dp t



I'- o Ca e 4 Roentgeno ram howing d location of the left h p before operat on Fi 10 Ca e 4 Roentgeno ram howing the hit in pla ter after open reduction 11 Ca.e 4 Roentgenorram howing the hip in po ition after open reduction

CASE 4 I D aved 4 years was first een in July 19 o and a diagno 1 of con enital dislocation of the left hip was made (F1 o)

T at nent An open operation wa performed ac cords to the u ual technique (Fig 10)

Rest !! In September 19 o the head of the femur was in good po ition. There was no hortening. In March 19 1 the pat ent could flex by hip to a ri ht angle. In Jul 1923 3 year after the operation the patient walked without a limp Flexion exten on abduct on and in ward rotation were normal. The re-ult was con-idered perfect (Fir 1)

CASE 5 F H a ed 3 cars and 10 month was fir t een on April 1 19 3 The child walked with a d tinct wad lie characteri tic of double con enital di location of

the b o (f 12)

Teatm 1 On June 1 10 3 an open operation was per fo med on the left hip a cording to the u ual technique The ne k of the femur was found two ted and the head wa flat Red ct on wa accomplished with difficulty 1 pla te p a was appl ed with the leg in the po ition of abduction internal rotation and hypere tension (FP" 13) On July 1 9 3 a new p ca wa applied with the internal rotation and abduct on reduced one half. The pica was emo ed on September 4 19 3 At that time the h p had 15 derrees abduction and rotation was free. The leg was in sl ht rotation ne e itat no a man pulation into abduc Ma a e of the thigh and calf was advi ed On March 18 19 4 the ri ht hip was man pulated under ethe and reduction effe ted 1 pla ter pica was applied with the ler 1 afrompo iti n On July 8 1924 a new 1 ca wa applied with th I - in the ame position On Septem ber 2 the plaster p ca was remo ed and a flannel one applied On March 1 19 the right lip wa man p ulated into exteme abduct on and a p ca applied

This pica wa removed on September 1 10 Res II On Septembe 9 192 the right hip was in good po it on and had mot n f om 3 derrees to 40 derrees. The left hip had fle on to 80 derrees and rotat on wa good On Januars 19 19 6 the m ht hip had 8, der ees to go derree herr n and a few degrees otati n The left hip had 20 derrees Lexion and a few derree rotation Both hip wit in position (Fr. 14) O April 1 192 nealy 4 year after the open reduction of the left hip all motion were normal. Both extremitie

were of equal lenoth The result wa e cellent Case 6 H S a ed years was first een on May 15

1023 This child walked with a dip of the right hip Flex

ion was normal but abduction wa limited Aro ntgenorram (Fi i) showed a high po terior di location

Tre time t On June 1 10 3 an open reduction was ac comple hed with diff culty. The inferior cap ule was found to be adherent to a hallow acetabulum 1 plaster pica was applied from the rib to the ankle with the leg abducted rotated internall and hypere tended (Fir 16) The spica was changed on July 10 1923 When this was removed on September 4 1923 the hip went early into 13 degrees abduction Internal rotation was po ible to a few derrees. Forcible abduct on and mas age were to be continued

Reselt On January 19 4 the child was walking She had about 80 derrees motion in flexion and good rotation On June 10 to 4 motion inflexion wa increa ed to oo degrees Rotat on was good There was shortenin of a of an inch The pat ent walked with only a light limp (Fig 17) On April 2 92 nearly 4 years afte reduction the h p could be the ed to a ri ht an le Rotation was about two-thids normal Abduction was almost complete. The e wa about / inch hortenin which probably will be compenated for before adult life

The result wa excellent

S G a ed 9 yea was first een in October 1023 This child w Iked with a limp of the ri ht leg A roent enorram (Fir 18) howed the trochanter to be high and postenor

T atm t On Decembe 11 1923 an open operation was performed according to the u ual technique. It was necessary to rotate the thigh 90 degrees in order to face the head into the acetabulum

Rentt On February 6 19 4 the p ca was remo ed The hip had 30 derree to 40 degrees moti n in flex on and free abduct on and add ction. On March 8 19 4 the h p was in pla e The child had about 2 degrees motion without pain and could abduct the hip On April 3 the hip had 40 degrees flexion and good motion in abd ct on and adduct on On September 16 1924 the child walked with a 1 ht 1 mp Manipulations we e ad 1 ed A roentgenogram (Fig 19) showed th hip to be in excellent position



11 15 Case 6 Poentgeno r mshowing d location of the right h pefore operation lig 16 Case 6 Roentgenogram shown the hip in plaster after open reduction Ing 17 Case 6 Roentgeno ram ho ing the 11sh hip in post on after open reduction.

Among the early methods of treatment were manipulation of the hip into extension in an attempt to draw the femur into position (Dupuy tren 19) subcutaneous operations with or with out manipulation of the hip into extension (Bouvier 7 Pravaz 46 Corndge 15 and Brodhurst 10) tenotomy of the pentrochanteric muscles (Guerin 26 Barwell 4) resection of the femoral head (Roser 49 Reyher 47) formation of a new acetabulum (Koenig 31 Tubby 55 Margary 41 Poggi 45 Ogston 42) and fivation of the femoral head to the iliac bone by means of nails (Witzel 58) or ivory pegs (Kitmisson 30) All of these methods are only of instorical interest in general they yielded unsatisfactory results

In 1800 Hoffa (8) brought forward the first procedure that offered a possibility of relief In brief his method was as follows. The capsule was exposed by an oblique incision made along the posterior border of the greater trochanter between the tensor vaginæ femoris and the gluteus medius. In the early application of his method Hoffa severed all the muscles attached to the greater and lesser trochanters but later he revised his technique to avoid this step. The acctabulum was deepened in forward and upward directions with large spoon curettes The femoral head was replaced A plaster spica was applied with the leg in slight abduction. In some instances Hoffa performed tenotomy of the hamstring ten dons and divided the fascia about the ilium

Lorenz (39) modified Hoffa s technique making an incision on the anterior external surface and sparing the muscles From 1892 to 1896 Lorenz performed 23 open reductions Good results were obtained in but few cases In general the mortality was so high owing to loss of blood and sepsis that Lorenz finally abandoned the method

While attempts were being made to obtain reduction by open intervention a number of surgeons in particular French orthopedists were experimenting with various closed manipulative processes and mechanical appliances. Through the efforts of Privaz (46) Paci (43) and Lorenz (39) a bloodless manipulative process was worked out Between 1805 and 1004 this method became recognized as the routine treatment of congenital dislocation.

Open interference however was not entirely abandoned All surgeons among whom were even the strongest advocates of the bloodless operation agreed that it was necessary to resort to open intervention in cases of marked displacement with a constricted capsule and in long standing cases Several orthopedist real izing the great danger of traumatism in manip ulative handling urged a more extensive use of the open procedure Sherman (51) in a pres entation before the American Orthopedic Asso ciation in 1904 pointed out in detail the trau matic danger which the manipulative treatment entails and called attention to the impossibility of securing reduction by this method in cases in which the capsule is narrowed. In 8 cases which Sherman explored he found only one in which the

hp p t



narrow part of the cap ule was of sufficient width to allow the passage of the femoral head

Sherman's (5) technique is as follows incision is made from the anterior superior iliac spine downward ju t external to the long head of the rectus femoris The capsule is in ised freely in line with the inci ion already made. The hip is flexed. A long bladed bistoury is guided by the gloved tinger into the acetabulum. The capsule is cut downward by pushing the finger against the blade inside the capsule and moving the handle of the bistoury to and fro with the hand The operator can then lide his finger along the knife into the acetabulum. The head is placed in the ocket. The thigh is extended abducted to approximately 75 degrees and rotated inward to go degrees. The knee is flexed When the hip and knee are in these positions the long head of the rectus is tight and lyin a it is directly over the femoral



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neck anterior luvation is prevented. The capsule on the inner side of the incision is not sutured but is carried downward and in aid with the neck as it moves with the head into the actribulum. The fascia lat is sutured with cargut and the skin with hor chair. A plaster of Pans splint is applied and worn for 4 to 6 neeks If necessary an osteotomy may be performed to sit the commonent parts.

Sherman reduced 58 cases by this method in 9 of these case reductions alone were per formed and in the other cases supplementary osteotomies were done. Twelve of the first group obtained functionally normal joints 8 have gone into anterior transposition 3 have stable reposition and 1 has become analysism. In the other group in which reduction was



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Fig 6 (left) Case 1 Roentgenog am ho ng di lo cation of the right hip before operation
Fig 27 Case 12 Reentgenog am sho ing the right hip in plaster following open reduction

followed by osteotomy 70 3 per cent successful results were obtained

In 1920 Galloway (23) following in the path outlined by Sherman began to use open interference in selected cases. His success with the method led to his resorting to open operation in all cases. Galloway considered that the best ages for open reduction were from o months to

years His method is as follows. The capsule is exposed by the Smith Petersen incision. The limb is rotated inward and the eapsule opened by a crucial incision. The limb is then rotated outward exposing the teres ligament. This will be found to lead to the acetabulum Any con striction of the capsule is freely divided. If the acetabulum is filled with fibrous tissue as usually occurs in children over 3 years of age and not infrequently even in younger patients the mass is carefully stripped from the roof and walls of the cavity and pushed toward the floor The head is reduced the hip skid being used if necessary The wound is sutured in layers. The capsule is not sutured. A plaster spica is applied with the hip in the position of abduction. Three weeks after application the spica is changed and weight bearing encouraged. The plaster band ages are changed at 6 to 8 week intervals and at each change the abduction is reduced

During the 6 years from 1920 to 19 6 Galloway (24) operated on 38 crses using various methods including the reduction method already described arthrodesis reinforcement of the nee tabulum and the formation of a new socket Nine were crses of bilateral dislocation. Fifteen results were excellent 18 were good and 5 although doubtful were not failures. It is an interesting feature that with one exception the patients who were cured were between 17 months.



I ig 28 Case 12 I hotograph sho ving all nment of limb after removal of plaster

and 2½ years of age while those who obtained good results were between 3 years 9 months and 9 years

Many different methods of reduction have been devised Ingianni (9) Ricard (48) Corner (14) Frisch (2) Lambotte (34) Lever (37) Tubby (55) LeDamany (35) Thomas (54) Patischke (44) Ludloff (40) Fairbank (0) Davis (16) Allison and Dixon (2) Willis (57) Berstein (6) Clarke (1) Bradford (8) and Burghard (11) have reported cases of open operation One of the largest groups of cases comprising 35 was reported by Deutschlaender (17) in 192 Deutschlaender called particular attention to the necessity of relaxing the illo psous for only when this muscle is at rest is it



Fig. 29 Ca e : Roe ti or m taken after remo al of pla te

possible to gain entrance to the head of the femur Thirty of the reductions resulted in both ana tomical and functional improvement

In cases in which reduction was impossible operators have used the bifurcation method the bone flap method and the process of construct ing a new acetabulum-procedures that have been mentioned under the discussion on treatment Lorenz (8) use I the bifurcation method in 60 case with excellent results. Some of the patients showed n signs of crippling and could run an l jump This operation has the advantage of relieving deformity even though the result as to function is n t entirely sati factory. Kortze born (, ) secured mo t gratifying results in 2 cases operated by this method

Amon those using the bone flap metho 1 15 Dickson (18) who applied it in 5 cases of old di location. The disability in the cases consisted of (1) a short limb ( ) an unstable soint and (a) abnormal posture Four cases resulted satus factorily with a gain in motion and a lecrease of the shortening. In the fifth cale infection

ga e rise to limitation of motion

Fairbank (20) reported a group of 11 cases in whi h he forme 1 a new acetabulum by turning do n a peri teal flap from the shum over the upper margin f the acetabulum In , cases the results ver satisfactory in 4 there was anterior repositi n in a arthritis developed and a case relapsed It as imposable to obtain information n the there es

Spee l (3) rej ried 8 cases in which a new acetal ulum a f rmed on the lateral surface of the ilium. Hi re ults were disappointing sta a g l but motion was restricted Adducti n c ntractures developed in a cases

Limp per i tel in s cral cases

The con tru 1 n of a new acetabulum in the vicinity of the normal cavity was tried by several or rat rs including Codivilla (1 ) I eFort (36) Krau e (3) Burghard (11) and Davis (16)

#### CACLUSIONS

The ope operation which afford the oppor tunity to tudy the pathology and which involves much less lan er than forcible manipulative and mechanical r cedures may be used to advantage more often than is the customary practice Examination f the pathological changes often reveal an h ur glass shaped constriction of the capsule or marked anteversion of the femoral neck or an acetabulum filled with adherent tissue covered over with the inferior capsule In the presence of such alterations the closed method is futile

Operative interference is indicated in children from 4 to 8 years of age when one or two closed manipulations have failed In older children it is the method of choice and in adults it is indicated to correct deformity and relieve arthritis symptoms

Simple replacement of the head within the socket is the ideal method of treatment. If are or extensive pathological chan es exclude the use of this method recon truction operations may produce results which are functionally and and tomically satisfactory

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# A FURTHER STUDY OF CLEFT PALATE¹

By M MCKENZIL FORBES MD MONTREAL Ct call f so 10 th pard S g y M G HU ty

In the early part of 1927 a clinical study of what was considered to be a new method for the treatment of cleft palate was described in the Canadian Medial Association Journal This study of cleft palate was based on the development of the superior maxillary bone

At birth and during infancy the measurement of the superior maxilla is greater in the antero posterior direction than in the vertical direction. In adults the vertical measurement is greater. In studying cleft palate one is impressed with the fact that this deformity is not due to lick of development but rather to lack of fusion of the component parts of the superior maxillary bone.

Sir Arthur Keith has said that in the majority of cases of complete cleft palate there is no de ficiency of tissue at birth nor for some time after birth and that he also agrees that the cleft how ever wide is not due to a deficiency of tissue in the several elements which form the palate but is entirely due to the fact that when the various embryonal parts or elements are developed and come together in the second month of develop ment the process of union which should occur then by a means similar to union by first intention is delived and does not take place hence the several palatal elements being inco ordinated by union tend to separate as growth occurs and the cleft increases during each month of growth

The aim of those who would treat cleft pilate by the method to be described presently is to re mold the upper jaw so that its vertical dimen sion is increased at the expense of the interoposterior and lateral dimensions

Let us examine the roof of the mouth with its hard and soft palates Included in the former are the maxille and premayille and the alveolur processes of the e bones. The roof of the mouth may be pictured as a horseshoe. We note that in a desire to close the cleft of the palate it will be advisable to approximate the lateral parts of this horseshoe without causing too great protrusion forward of the anterior parts represented principally by the premarilke and also by the anterior cornua of the superior maxille

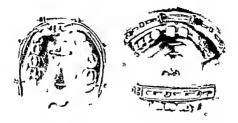
We must aim to stimulate the normal development of the superior maxillary bone by increasing the vertical measurement of the upper jaw as opposed to the anteroposterior measurement. This we feel can be done

The object In planning our modus operands we must bear in mind the importance of the fact that our object is not only to make lateral pressure to close the cleft but to regulate this atteral pressure because such lateral pressure might force the premaxille and adjacent parts too far forward.

Our aim is to reduce the transverse and interoposterior dimensions of the roof of the mouth by heaping up the tissues in front and on the sides in much the same way as a farrier remodels a horseshoe by hammering every section of red hot metal in order to reduce its size and increase its strength by changing its form ²

To do this pressure must be everted on the outer surface of both mavillary and premaxillary alveolar processes. No part must be left unguard ed. Pressure is made by the application of plates of German silver molded to conform to the outer and anterior aspects of the alveolar arch. I result to the outer and the process of the silver was a surface of the silver with the solution of the solution of

It to the milyth power the lipth by make the post potential fill a potenti



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sure is everted in these plates I means f threa helwres which it carried tran virsely through and across the pulatal arch through the ability prix, e ses in either side again to just through the perforated (slott) is liver j late in either side. The plates are hitted to the course by main if small muts which are used it regulate the pressure brought to bear in the silver july a Vir he plate are faith in all this pressure. In tribute levenly throughout their len th

The ur s The first step in the operation for the relief of cleft palate by the method is to introduce two tran ver t vires from the alveolar process of one side to the alveolar process of the other side This e do with difficulty We try to place thes wires as high as we are able in younger patients if po sible above the hard pal We must not interfere either with the erupted or unerupted teeth We endeavor to in sert these ares in positions most advantageous to exert pressure by traction in order to modify growth and leformity. The posterior transverse wire must be placed as far posterior as possible and the anterior transverse vire must be placed not too far from the anterior extremities of the superior maxillæ

The plat The second step in this method is the insertion of the three plates used for the compression of the palate. The anterior plate everts pressure on the anterior part of the arch and is fashioned so as to cover the anterior surface of the premavulary and the anterior surface of the

maxillars alveolar proce es. A slot is cut in the long axis of this plate so that it may be main tained in position on the transverse wires already describ d and o that it may be forced in a posterior direct in by traction on the lateral plates.

The two lateral plates are fashioned to cover the external surface of the maxillary alveolar proces es These are very much the ame size as the lead plates at one time used by Brophy for a somewhat similar purpo e The anterior extrem its of each of these plates extend forward to about the po its n of the lateral incisor tooth on each side and is turned outward at a ri ht an le to the plane of the plate. This out turned et tremity 1 perfor ited for two traction wires fitted with nuts hich are used to connect the out turne I extremities of the e two lateral plates A slot is cut in the long axis of each of these plates so that these plates also may be maintained in position by the anterior transverse wires already described an I yet be freely movable in an ante rior direction These Interal plates are perforated po teriorly for insertion into the posterior trans verse wire which anchor these plates No move ment is po sible at the point of in ertion of the posterior transverse wires into the perforation a the plates are fixed to the posterior tran verse wires with two small threaded nuts

These three plates may be fashioned on a den test s plaster east of the alveolir processes and roof of the mouth These plates are made of a hard metal such as German silver but if advis able lead plates of a similar size may be inserted underneath these rigid plates for the purpose of

protecting the gums

Interoposterior compression After the three plates are in position, two threaded wires are in serted between the out turned extremities of the lateral plates the latter being superimposed on the anterior plate. These threaded wires are for the purpose of traction and are fixed in position by nuts. It will be seen that these wires connect the anterior out turned extremities of the lateral plates and thus maintain these plates in position The lateral plates can be this connection well control the anteroposterior pressure exerted by the anterior plate through traction on the lateral plates This traction is made by the nuts which maintain these two anterior traction wires in position. These nuts regulate the compression made on the palate

It will be seen now that if traction be made on the two lateral plates by tightening the two traction wires pressure by traction will force the anterior plate backward and bring the posterior and lateral surfaces of the alveolar processes for ward so that the whole superior maxilla will be compressed by pressure exerted in all directions over the external surface of the alveolar processes The backward sliding of the anterior plate is made possible by the fact that this and the lateral plates have been fashioned with slots into which the anterior threaded wires fit. The arrangement of the slots on the anterior plate and the two lateral plates are complementary to each other The anterior transverse wire fits into both of these and maintains the level of these plates on the outer surfaces of the alveolar processes Pressure in a posterior direction as well as traction in an anterior direction is assured by tightening the anterior or traction wires. As the anterior plate is carried backward and as pressure is everted on the lateral plates by tightening the nuts on the transverse wires the alveolar processes of the maulfer and premaraller will be remolded in such a way that both the internal and the external architecture will be changed and growth must of ancessity be in a vertical direction. Viz. from below upward instead of in an anteroposterior direction.

The extraordinary power exerted by this apparatus has been proved by test. It is a power which must be used wisely. Whether it is best to attempt immediate or forcible correction or rather the gradual correction of the orthodontist will depend largely on the chracter of the deformity and the age of the patient.

The future changes in the architecture of the alveolar processes and the influence everted on the eruption of the teeth are not fully known

Whether this method will be found useful in other conditions such as fractures and orthodontic affections is open to question. Let we feel that this study of cleft palate has heen worth while because a method has been evolved which has already manifested its usefulness in certain cases.

In some cases modifications in the technique have been made so as to meet special conditions

Norr—In this study I have been but the directing spirt 1 group compose of of Do tors II I Derome 1 D lagus C M kuth and R Bretman ha call cont is used The plats or plate which we 1 are made in 2 mach n mot ingenously planned by M R I ranh. Gird of of Vlonteal no fired and allelight for our ue by tho exhola e contibuted to the All Mas n I und of the Prantice of Quefer.

#### Lydometrial ADENOMATA IN ABDOMINAL SCAR FOLLOWING CASAREAN SECTION

BY WILLIAM I CHIMAN AND B. A. f b P B tB hmlf n l

DENOMATA of endometrial type occur in a lult females and may le located within the abdomen or in its wall but never above the level of the umbilious. The diversity of the sites in which they have been found is perhaps appr ached only by the number of theories of their

Emb you the ry Ascarly a 1803 von Reck linghau en (35) liscussed the subject of endo metrial aden imata and suggested that they might arise from embryonic rests derived from the wolfhan body. Bit of this body have been described near the site for the inguinal canal in the embryo This theory might therefore account for the endometrial adenomata of the round ligament but it would be difficult to attribute to the wolffian body occupying a dorsal position in the embryo the production of endometrial tumors in the anterior abdominal wall of the a lult

Cullen (8) in 1914 suggested the possibility of remnants of Mueller's ducts as a point of origin Again it would be difficult to account for endo metrial tumors of the abdominal wall or the umbilious on such a basis although it might le applicable t those of the rectovaginal sentum or the broad ligament

Perit real theo v Lockver (17) in 1018 reported 47 cases of adenomyomata with endometrial glands in the recto aginal septum and thought that the perit meum or va ma was the source of the epithelium in most of these case Meyer ( o) believe I them to be of inflammatory ori in Recently Nicholson (21) in a review of these tumors in laparotoms scars upheld the peritoneal the ry

Di pla em nt theory Cullen (6) in 1897 sug geste I that the adenomyomata of the uterus with glan is i en i met tal type were due to the in vasion of the uterin vall by its mucous mem brane In 1 ; 1 Sampson (6) reported hi first

case of end metrial tissue in hemorrhagic cysts of the vary which he held to be due to the implantat in f endometrium escaping from the open ends f the fallopian tubes Since that tim an attempt has been made to account for most of the end met all tumors on the implantation basi Bonney (3) de cribed a case in which ende met inl tis u was accidentally implanted in the ab lominal sur luring a hysterotomy with curet

tage 1 typical endometrioma developed in the scar and was excised two years later

Adenomyomata of the round heament con taining endometrial glands and stroma have been reported by Martin (19) von Recklinghausen (36) Cullen (5) I fannenstiel (3) Blumer (2) Weber (37) and Semmelink and de Josselin de Jon, (33) Similar growths in the ovarian ha ment have been reported (7) Lockyer (17) col lected 47 cases occurring in the rectovarinal wall

Cullen (5) reported an adenomyoma of the en dometral type occurring in the labium maius appearing 7 years after an instrumental delivery and becoming swollen and painful durin men struction A similar growth was reported by you I ecklinghausen (16) and one more recently by Henry (15)

Green (13) reported an adenoma of the um bilicus containing glandular elements of uterme character Cullen (9) collected 11 such cases and Weller (18) has recently reported 2 more

I ussell (25) demonstrated the presence of en demetrial tissue in the ovary in 1800. The was confirmed 1 y Caster (4) Culten (10) and Norris (2) Since 1921 Sampson (26 28) has reported many such cases. I ndometrial adenomata have been found in many locations in the abdominal cavity including the appendix (3)

The cases of a knomata of endometrial type occurring in laparotomy scar have been re viewed by Lemon and Mahle (16) Nicholson (21) and I ratt ( 4) The latter reviewed 46 cases up to 19 6 and found that the age of occurrence varied from 0 to 46 with an average of about 35 years Pain in the scar during menstruation was the most constant symptom and was present in 55 per cent of the ca es In 10 cases there was a lefinite connection but een the tumor and the uterus I ocal excision was sufficient to remove the growth in all but 2 cases but in these a second complete excision was successful

The frequency of endometrial adenomata in hparotomy scars with relation to the operations I which they were preceded is shown in Table !

Schwar and I a ldock (3r) found endometrial adenomata in the abdominal scars of guinea pigs which had been subjected to crestrean section The cases of endometrial adenomata occurring

in laparotom; scars after the opening of the



Fig r Photomicrograph Case 13 sho in endomet ial adenoma

pregnant uterus have been collected and new cases are added

CASE Von Franque (34) reported the ca e of a woman who had had an ope ation 4 vent 1 e vous for rupture of the uterus du mg abo t on When e ammed she had a tumor the size of a a laint in the abdom all scar but no symptoms referable to it. The tumor was removed a dwas found to contan ty pucal endometrum vas

CASE 2 T S Cullen (t) reported the ca e of a woman af y ears old ho had a epan of the uterus ruptured during abortion 9/ years pre 1018 There was a tumor nodule n the abdominal sea 5 by 5 by 3 centimeters. This was removed and proved to be an adenomy oma of the rectus musels.

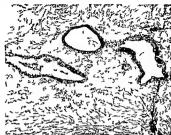
CASES 3 and 4 J A Samp on (27) repo ted the e ca e for F B Mallory of Boston No I inical data was given but the two specimens viere adenomata of the endometrial type found in the abdominal scar after ca a can sect on

Cssrs s and 6 C I Burnam report d these ca s for T S Cull n in the d cussion of J A Sampson s paper (11) A case of J L Stave, of Washington and n of E L C dman of Boston with adenomy omata in the aldom nal sear following cæ arean section

Case 7 J.A. Sampson (28) repo ted a case of Good and Mallory V woman 3 years old 1 da cæ a ean ectton in 0,3 a left silp ngectom in 10,5 and supra aginal 1 sterectomy in 10,17. She not ce la small noulle in the abd minal scar a few weeks after the 1 toper ton. It predually increased in 2e but 13x symptomle and we moved in 10,22 1 teorita ned typical notion 1 all tissus

CASE 8 N S Heaney (14) repo ted the car of a woman 32 y ar of age who had a case aen section in 1921 O e year liter a sore lump appea el in the abdomn al scar and w s tende and extremely painful during, menstruation. Two ears later a nodule the size fa walnut was removed for the rectural fascial fu was h d and c ta ned many blood filled pace. U croscopically it provel to be a tip el endometrial adeno na

CASTO N S Hea ext 4) reported the ca e of a soman 38 ye old who lad a findal ci non and a 60 7 seek ovum rem ved thar und lament ope ton and e ct on of the uterinee d fith tules Ste oon not cel a tenders will injurite ca which became termed pun ful and enlarged duing menstru ton Three, ye slater a nodul the prof almut removed firmtle rectu



Γι Photom cro raph Ca e 4 showing endometrial adenoma

fascia on the fir t day of the mensitual period. It was found to contain many small hamor has c cysts and mi cro copic evam nation re ealed it to be an adenomi with typical endomet ial glands in cit ve mensituation. Cast to W. C. Danforth (r) reported the case of a

CYSE TO W. C. Dantorth (r) repo ted the case of a woman zo years old who had a cæ arean sect on and exection of the utene ends of the tube fo te ilszation. Ste refi ned years later with a tender hard mass in the scar which did not ary with the menatr all periods. It as exqued and pro ed to le an el domet all adenoma.

Cast 1 O H Schwa z (3) reported a case for A Trumpe 4 woman 88 vear old had a cur aren ser on the han une entful con alescence 3 years prevous Two vears after the operat on she compila need of a sensitive spot at the upper end of the abdorm all car vhere a nodule the zeo of a cherry was found The nodule was removed and mic o copic study revealed the presence of endometrial ti su

CASE 2 C Be kelev (1) epo ted the ca e of a woman

30 years of age who had a cess ean ect on in 1920. Three year later a small lump appeared at the lot er end of the abdomical scar. The tumor gr dually inc eased in sie and wise pecually pa inful during the menstrul pe jod. When the patient vale amined in 1025 the tumor wanch in dameter freely movable on the deep fascia and tender while the shin over it was adherent and pi mented for removal the tum rivas found to have no connection.

th the uteru or pe itoneum Micro copically it proved to be un endometri l adenoma The 2 following case are from the Su gical Se vice of

the P t B nt Bri ham Ho pital Bo ton

CASE 3 \ \text{woman} 28 years of g gave a hi to y of

ha ing been subjected to a cæ ean ect on 4

TABLE I		
Op t	c	P tg
Ventrof vat on of ute us	8	37
Opening of the pregnet ut ru		
Pel 1c operations ( alpingectomy		3
oophorectomy)	10	20
Su pension of the uterus	5	10
Appendectomy	3	6
Hyste ectomy	I	
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### SUMMARY AND CONCURSION

Endometrial a lenomata in the abdominal scar following opening of the pregnant uterus have been reported in 12 ca c These cases are here reviewed an l new cases are a lded

The most frequent symptom is pain in the scar during the menstrual period Local excision is sufficient for removal of the tumor

The implantation theory voul I seem to give the best explanation of the origin of this group of endometrial adenomata

The occurrence follo ing cæsarean section vould suggest the use f the lo type of uterine incision as the lining 1 chiefly cervical mucosa in that region

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### CONTROLLABLE SPINAL ANÆSTHESIA IN OBSTETRICS

By GEORGE P PITKIN M D FACS AND FRANK C MCCORMACK M D TEANECK NEW JERSEY
Th H IVN m H pt 1

AMERICAN medical literature does not contain a description of any technique whereby anæsthetic agents may be introduced into the subarachnoid space of the lumbar spine so as to produce caudal anæsthesia. Fur thermore a careful search of the literature fails to reveal that gliadin has ever been used to prevent dissemination of anæsthetic agents in spinal fluid thereby controlling the extent of anæsthesia on the body surface.

In our experiments with controllable spinal anæsthesia it has been definitely demonstrated that if 2 cubic centimeters of anæsthetic solution are injected into the subgrachnoid space anæs thesia will extend upward in the canal to and including the third and fourth lumbar nerves In small spines it may extend as high as the second lumbar interspace but if the amount of solution is decreased without a change in the amount of novocain it becomes possible to confine the anesthetic to the lower portion of the spinal canal so that only the sacral nerves become anæsthetized (10) producing anæsthesia limited to the permeum a typical saddle anæsthesia which is limited in front by the symphysis and in back extends over the lower part of the sacrum and down the inner side of the thighs for c or 6 inches There is no impairment of motion or anæsthesia of the legs. The technique of limited spinal anæsthesia has been employed in 27, gy necological and rectal cases without any devia tion a typical caudal anæsthesia produced intradurally The method of confining spinal anæsthesia to the legs and controlling its height on the body surface has been described in detail (18) Therefore it would seem that the number of successful cases has been sufficient to justify mention of this particular form of technique

In female patients the cervix vagina peri neum vulva and sphincters of the anus and bladder are completely annesthetized while sen sation of the uterus is not impaired. The cervix can be dilated without pain but curettement of the fundus is nunful

Realizing the possibility of these results in obstetrics we prevailed upon the Obstetrical Depyrtment to permit the use of this form of limited spinal anaesthesia in their difficult cases. The results were so satisfactor in 89 cases of instrumental deliverus versions breech cases. and prolonged labors that it seems worth while to report the findings and the deductions which bave been made

After the first two deliveries with the patient in a Trendelenburg position the impracticability of a solution of light specific gravity was apparent and glucose was substituted for the alcohol in the controllable spinal anæsthetic preparation (18) and a 40 per cent instead of a 10 per cent novocaun solution employed. This permitted the same limited anæsthesia and allowed the patient to repose comfortably in a semi reclining position throughout delivery.

The technique of controlling the an esthetic

solution and limiting its contact to those strands of the cauda equina that pierce the tip of the dural sac forming the sacral nerves (Fig. 14) is relatively simple with the use of ghadin (the mucilaginous content of wheat starch) which prevents dissemination or mixing of the anæsthetic solution with the spinal fluid until the anæsthetic agent has been absorbed. Too much ghadin in the solution eliminates all anæsthetic properties or greatly delays anæsthesia. Too little ghadin causes the solution to be devoid of all controllable features. The ghadin also has much to do with the lessening of the tovic symptoms of the novo

The technique employed in the use of this solution varies somewhat from other forms of spinal anasthesia. When deviations from the ordinary routine of other methods of spinal anasthesia are employed an explanation will be made.

milligrams (21) of novocain may be employed

and will give less reaction than when roo milli

grams are dissolved in the spinal fluid and re

intected

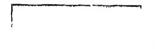
With this preparation 200 or even 400

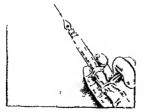
When local conduction or spinal amesthesia is used the paramount issue at all times is never to hurt the patient in any way at any time. A patient once hurt may lose confidence in the method and in the doctor. A confidence once lost may be very hard to regain and many times constitutes the direct cause of unsuccessful aness thesias. A patient that is immediately subjected to one painful manipulation becomes over apprehensive of every following procedure. In spinal amesthesia with novocun it must be remembered that tactile sensationis notabolished.



All the more rea on hy every precaution should be taken and the technique employed with such in see that spinal and thesia may be admin i tere! without producing any pain. With an

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entirely satisfactory anasthe in the patient should be at ease comfortable and cheerful throughout delivery

To perform the lumbar puncture rat e the head of the d hvers table from rs to 20 de rees (Fi 1). This degree of elevation is hard to jud e but is residis measured by the use of the tiltometer. The princip state is then in a signific river e Trendeen burs, position and should be kept so throughout the course of delivers. If for an reason the is impossible she may be placed nearly flat but not until after the anasthesia has become fixed namely from 22 to 15 minute. If an adjustable delivers table is not available pillon's may be employed to secure a similar position (Fig. 12).

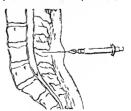
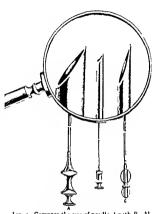


Fig. 5ho tintit ft tp i et i but ot it ptfpu



I ig 5 Compare the size of needle 1 with B All o compare the taper of needle C with that of needle B the authors spinal puncture needle

The patient should be turned on her side preferably the right. The knees should be flexed upon the abdomen the head bent forward so that the chin rests on the chest and the back bowed out (Fig. 1) The shoulders and hips should be in a vertical line. If the shoulders are tilted and the hips remain vertical or if the hips are tilted and the shoulders perpendicular a cork screw spine will be produced and may present difficulty at the time of puncture A scaphoid back should be avoided as this causes the spinous processes of the vertebre to over ride and makes puncture difficult and painful If the physician is unfamil iar with the technique of this position the patient may be permitted to sit on the edge of the delivery table with the feet hanging over the side the body bent forward the elbows resting on the knees and the back bowed outward (Fig 2) She may be permitted to remain in this position for from 10 to 1 minutes until anæsthesia becomes fixed or may immediately be placed in a semi reclining position with the head of the table elevated as already described. However in the sitting position the patient's comfort and ease is disturbed \ever permit the patient to be

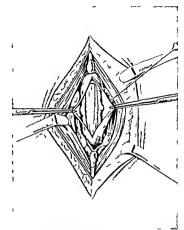
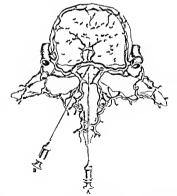
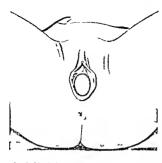


Fig 6 His traing the min atu e trap doo cut in the dura made ith the autho s cedle



I ig 7 I The correct way to make a p n l puncture B the incorrect way Note the exten ive venous supply



Fg 9 Tihddp tope til rihtuzd tid nim thit \the hpleidm ct the mph

entirely flat or in a Frendelenburg position (2) when the heavy solution is used as there is danger that the solution may ascend high in the canal and produce a Irop in blood pressure nausea venturn and headaches

The kin from the eighth dorsal to the lower part of the sacrum is painted over an area 5 or 6 inches wide with a 3 per cent tincture of iodine If for any reason i dine is contra indicated 5 per cent mercuro hrome may be substituted The logical site to introduce the spinal puncture needle for this particular form of an esthesia sould be the lumb sacral interspace so as to intro luce the anx thetic solution directly at the site f ntact but unfortunately in a number f a sve have found that the dural sac terminate ab v this interspace therefore the fourti int r pic is sel cted as the site of punc The may easily be determined by pal ating the pin us processes along an imaginary line Ira n bet cen the crests of the iba When the inter ic between the fourth and fifth lumbar v rt ire has been determined it may be marked by firm pre ure with the thumb nail of the glacel hand. At this site a cutaneous wheal 1 raised 1th 0.65 cubic centimeter solution of nov cain 003 ephedrine 05 and normal saline qs 1

A line 5 or 7 gauge hypodermic needle is u ed (fie ) The needle is not withdrawn but is carried directly into the interspinous ligament () and the other 0 65 cubic centimeter of the



15.9 Th ttfrthe fmthbk

solution injected as the needle advances. One should endeavor to inject the solution a hite firster than the needle proceed so that then edle is introduced into a freshly and theized are (lie 4). To stood the unpleasantness of havin to dig out a broken needle it is advisable to have the needle equipped with a safety guird similar to the one shown in the drayings.

Spinal puncture is made through the center of the sheal raised with the novocain ephedrine solution with a fine 22 gauge lumbar puncture needle The needle should have a short bevel of 15 degrees (Fig 5 B) as in the author's spinal puncture needle. The rear part of the bevel is rounded in such a manner that it has no cutting surface while the reverse side of the point is ground so as to produce a spear point. When this needle pierces the dura it cuts a miniature trap door (18) which is closed by the intradural pres sure when the needle is withdrawn (Fi The spear point of the tip permits easy penetra tion of the skin and tissues For many rea ons rustless steel needles are superior to nickeloid or The point remains sharp nickel plated ones longer than that of the ordinary needle There 1 no nickel plating to peal off. The needle will not tarnish become rough or pit it will not rust on the inside nor break unexpectedly and it i tempered so that it will stand extreme bendin and manipulation without breakin case the stylet should be removed and the needle bent into a semi-circle before it is sterilized This testing may prevent the unpleasantness of removing a broken needle from the interspinal ligament

Avoid using a needle of large caliber such as the oll Bier 15 to 17 gauge needle (Fig. 5 1)

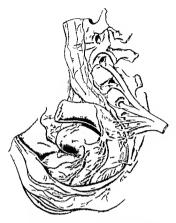
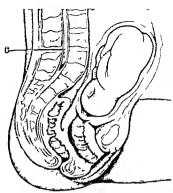


Fig. 50. The ner es to the r fundus of the uterus 2 courty 3, bladder 4, thut 5 branches of the hypogratury levus and 6 the sympathetracenest are the test of the following are annestheted 1 the pudendal pleus II and the eervical vaginal and vesical nerves III penneal II eutaneous 19 posterior nerve of the chronic II labial 1/II middle hæmorrhoidal 1/II inferior hemorrhoidal and sphinter an i from the sacral perior the foruth and fifth lumbar (L/II and L/I) and the first sacral (S/I) are somet mes anaestheted.

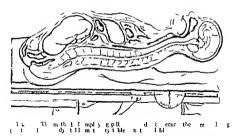
which will not only cause unnecessary pain when it is introduced but will traumatize the tissues and often produce postanæsthetic backache large needle may produce intradural hamorrhage or it may injure or cut the cauda and permit seepage of spinal fluid into the extradural tissues because of the large hole left in the dura Long tapered (Fig. 5 C) needles produce bleeding more frequently at the time of puncture. With their use anæsthesia is frequently unsatisfactory because a part of the taper is within the dura and the remainder outside or a part of the taper is within a vein and the remainder in the dural sac Should only a part of the taper be within the dura some of the solution is deposited extradurally thesia will be unsatisfactory or incomplete Should part of the taper be within a vein when the solution is injected convulsions may ensue With a short tapered needle as shown these undesirable complications rarely occur When



Fi 11 When the anæsthetic solution is introduced into the subarachnoid space it gravitates to the extreme up of the dura and produces an esthesia of the tissues as shown by the shaded area

the puncture is made through the interspinous legament care should be taken not to deviate to the right or left. The puncture should be at right angles to the long axis of the spine. Never attempt a puncture between the lamine (Fig. 7. B) Avoid inserting the needle in an upward direction or at an acute angle to the spine. The vens about the cord are large and numerous but may be avoided and not penetrated if the spinal puncture is made in the manner described (Figs. 7. A and 11). Unnecessary bleeding will surely be produced should the puncture be attempted between the lamine with the needle tilted with a needle of large chiber or with a long tapered point.

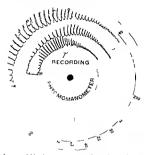
When the dura is punctured there is a slight snap which is recognized after the first few punctures and the needle advances with less resistance. If possible avoid piercing the opposite site of the dura with the point of the needle or coming in contact with the body of the vertebra because this also will cluse bleeding (Fig. 7 B). With the assurance that the dura has been entered the stylet is removed and spinal fluid should flow through the needle. If no spinal fluid appears rotate the needle on its own axis. If there is still no spinal fluid insert the needle deeper. If bony resistance is felt (the body of the



vertebra) the needle has undoubtedly deviated to one side. It should be withdrawn to the sharface and re inserted at a slightly different angle to the ri ht or left as the case may be Always have the stylet in place when making manipulations. Occasionally the first drop or to of spinal fluid will contain blood. If this clears the injection may be made. If not the needle should be withdrawn and re introduced. The injection of the antisthetic solution should never be made until clear spinal fluid flows through the needle is high is the only assurance to the side of the injection of side and the side of the injection of the antisthetic solution should never be made until clear spinal fluid flows through the needle is high is the only assurance.

that the point of the needle is within the dural sac Unless the solution is injected into the subarachnoid space anæsthesia will not be satisfactors.

It's advisable to fill both hypodermic synings with the respective solutions before spinal puncture is started. The filled syninges and needles should be placed in a convenient position to the operator before the procedine is started. Attach the syninge with the olution containin now cann 2 ghadma solution 13, strychnine sulphate con glucose of 5 and normal saline qs 5 to the spinal puncture needle. Aspirate one or two drops of spinal fluid to make sure that the needle has not been displaced then slot by inject the contents of the syringe. Do not again aspirate or in any wax attermot to mix the solution with



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the spinal fluid Withdraw the needle and cover the puncture wound with collodion or a small square of adhesive plaster. Turn the patient on her back. Anæsthesia will be complete as soon as the patient can be prepared and draped. This procedure limits the contact of the solution to the lower tip of the dural sac and causes ares thesia of the perineum only (Fig. 8).

It is better to have a syringe with a secure locking device to insure a tight fit to the needle [Fig 3] thus preventing the possibility of injecting air into the dural sac or leakage at the connection. With a locking device on the syringe the needle may be manipulated if necessary and if the patient moves there is little chance that the syringe will be disconnected from the needle and some of the amesthetic solution lost. With the locking device employed needles never become jammed and there is no leaking at the connection.

The semi reclining or reverse Trendelenburg position of from 15 to 20 degrees should be maintained for 13 to 2 hours after injection so as to avoid the possibility of having the nies thetic ascend in the canal also by retaining the anasthetic low in the dural sac headaches will be greatly diminished. If for any reason anass thesia is desired higher on the body surface it can be obtained by mixing the solution with spinal fluid. This is done by aspirating and re injecting

4 or 6 cubic centimeters of the spinal fluid Four cubic centimeters aspirated and re-injected will produce anasthesia of the legs. Six cubic centimeters will carry anasthesia to the umbilicus and 8 cubic centimeters to the costal mirgin For the higher anasthesia the viscid alcohol solution is preferable, as this will permit the patient to be placed in a level or Trendelenburg position. The heavy solution should never be used when the head is to be lowered.

Pre operative narcotics are not necessary in this form of an exthesia. The relief of pain afford ed the mother allays all fear and apprehension. Morphine and scopolamine if used may possibly so affect the child that strengous resuscitation methods will be necessary. The mother may remain in a dorsal recumbent position or may be placed in stirrups without effecting the limitation of the anaesthesia provided the body is kept in a reverse Trendelenburg of from 15 to 20 degrees.

Many advantages of controllable spinal 'næs' thesia were found in a study of 3 724 cases of general surgery including of casarean sections and 89 obstetrical cases as compared with various forms of inhalation anæsthesia. The apparatus required for the introduction of this arresthesia

is comparatively inexpensive and may be found in almost every physician's outhit two (2) cubic centimeter hypodermic syringes one hypodermic needle one spinal puncture needle and the anx s-

thetic solution

The technique is very simple No greater knowledge is required than that of doing an ordinary diagnostic lumbar puncture the details of which are familiar to every physician Should there be any doubt as to the simplicity of the procedure 10 minutes practice on the cadaver will familiarize any physician with the ease with which a lumbar puncture may be made in the fourth interspace.

A limited spinal annesthesia may be adminis

tered by the operator himself thereby eliminating the necessity of an anasthetist or an assistant This would appear to be a very great advantage in emergencies in isolated or country practice or in small hospituds without internes

The anesthesa is queely secured in from z to

3 minutes after injection. It becomes fixed within from 10 to 12 minutes. Satisfactory and complete arresthesia occurs in over 99 per cent of cases. Or account of the ease of introduction and rapidity of action it is better than sacral or caudal anasthesia (17) which is invariably delayed from 5 to 25 minutes after injection. Caudal anasthesia is estimated to be unsitisfactory or in complete in from 15 to 5 per cent of cases. The injection of the hatus requires considerable shill and practice the same may be said of parasacral anasthesia to say nothing of the pain frequently caused as a result of inexperience or awkwardness.

The safety of an intradural sacral anasthesia is much greater than ordinary spinal anæsthesia and may be conservatively estimated as being as safe as caudal anæsthesia. The mother suffers no shock or drop in blood pressure [1/g. 13]. There is no danger of suffocation cyanosis strangula tions or swallowing of the tongue or false teeth as with inhalation and thesia. The child is better protected than with any other form of aries thesia. Asphy vaction or cyanosis of the child is rare. The effects of morphime scopolarimic.

thesia Asphy vauton or evanosis of the child is rare. The effects of morphine scopolamine ether chloroform various other narcotics and anæsthetics are unquestionably transmitted to the child and at times make resuscrition difficult. A distinct idvantage is that the unsatiscian may be confined to the perineum or carried to any desired height on the body surface by expanding the solution as described in the technique. It also eliminates postanes thetic complications. Due to its limited field of contact intradurally (Fig. 17) it does not produce the after effects encountered with stovaine or neocaine spindle

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anesthesia such as vomiting and headache (13) It does not affect the heart as does chloroform and has no effect upon the kidneys or liver as has ether () Postoperative lung, and intestinal complications are reduced to a minimum

Dehydration is not produced with this form of an esthesin (10). A distinct advantage in cales of colampsia and toxalmia is that water or liquid may be given freely before during and after

delivery

It assures the co-operation of the patient throughout delivery which is a great help when it becomes necessary to change the patients position particularly when assistants are unavailable. The patient is able to bear down and aid in delivery.

It may be given to patients with bronchitis or influen a without harm. Cardrice nephritics alcoholics addicts or patients suffering with primary or permi 1000 an emia take this form of anasthesis much better thru inhalation. Hyper tension r hypotension is not affected. Regulation of the amount of ephedrine controls the blood pressure.

Shick is eliminated (11) The reflexes are blocked severe and prolonged cases are carried through ith little if any change of condition. There is no unpleasant postpartum reaction.

Vomitin, during or after delivery is a rare occurrence. This may be accounted for by the fact that the blood pressure is not affected and the splanchnics are not any aftertized.

Distention or ileus does not occur as with inhalation unesthesia. The sphincters are re layed peristalsis is stimulated—a distinct advantage especially for the patient's comfort.

It increase the patient's comfort during and after delivery. There is no lowering of her resist ance. Nourishment may be taken immediately

after delivery (a)

The blood pre sure is not affected. This is a distinct advantage over other forms of spinal aniesthesia. In his cannot be administered in severe cales of hypotension. It has been used with success in cases in which the systolic pressure as 78 without change throughout the pro-edure.

Postpartum hemorrhages are less frequent The uterus contracts quickly and firmly after delivery. Pituitin may be used without ferr The anæsthetized cervix offers little or no resist

ance to the advancing head

The cervix and perineum are protected to a greater extent from trauma and lacerations. The amount of relaxation and elasticity of these parts when unesthetized is amazing Cystoceles are not apt to be a postpartum complication. The bladder spontaneously emptes during delivery becau e the sphincter is ansatthetized.

laginal casareans may be eliminated. The cervix readily dilates or may be dilated manually

with ease

The mortality and morbidity of obstetred cases are reduced because shock to the mother and postpartium anasthetic complications do not occur. The child is offered greater protection because there is less trauma in forcible delivents as a result of the relaxation of the soft parts and because there is no absorption of towns from narrootics or inhalation anasthetics.

The disadvantages of intradural sacral ansithesia in obstetries appear to be few and of little consequence. The so called dry taps may be advanced as a disadvantage. It i doubtled such a condition really evists and may be attributed more to inexperience than to any pathological condition. Possible mjury to the cauda equinn may be considered. When such a complication exists it is not infrequently traceable to a bungling technique or the use of large spinal puncture needles.

Terhaps one of the greatest disadvanta of that can be attributed to this form of anishess is its duration which is from 90 to 20 minutes Should the duration of the delivery exceed the time of the anistlesia there is no reason why a second injection should not be given. The duration of a second injection of the anishlesia is magniable longer than the first a to 3 hours.

It is hoped that our intentions will not be mis interpreted or misconstrued. We do not with to imply that this is the ideal and only form of masthesia to be employed in obstetints. It is offered as being simpler quicker and more efficient than caudal or sacral anasthesia, and as a method of reheving pain suffering and micro in those unfortunate cases in which vanous forms of inhalation anresthesia would be detimental to mother or child or both

The indications in obstetrics for limited spinal anasthesia in preference to inhalation anresthesia are sological and well founded that if the patient's welfare is to be considered a workin. knowledge of this form of anasthesia should be possessed by all obstetricians so that the dangers of inhalation untsthesia in certain obstetrical cases may be avoided and many useful lives saved.

There appears to be no well grounded or sound reason why inhalation anasthesia should be used in tuberculosis (6) acute chronic or arrested cases In acute tuberculosis the conductivity of the chronic or arrested cases.

tion is invariably made worse to say nothing of the numerous pulmonary complications that may develop. Not infrequently the chronic or arrested case is converted into an active case. To adminis ter any form of inhalation anisthesia to a patient suffering with acute or chronic bronchits is to run the risk of fatal pneumonia.

Patients suffering with asthma or emphysema appear to be greatly relieved with the administration of spinal anæsthesia. Perhaps this is due in part or almost wholly to the effect of the ephed rine. At any rate the after effects of inhalation anæsthesia should always be borne in mind in

this particular class of cases

In cardiac conditions with decompensated hearts the cyanosis produced by the efforts of labor pains is relieved at once. Dyspiner is lessened and the patient's condition relieved in stantly. If apiner is present the patient is able to resume a reclining position without discomfort. High spinal anæsthesia relieves these conditions entirely.

In cases of eclampsia (24) and toxemias of pregnancy the kidneys are not affected as with ether. Suppression does not occur and elimination is not affected. The putient is not dehydrated. There is no primity, withholding of fluids at the time of delivery or secondary loss by you time as a result of inhalation nurshesia.

The acidosis (12) which is invariably present in this type of crose is not increased but is often lessened because of the increased perstatiss and relaxation of the sphincters. Any form of inhala tion anæsthesia however will increase acidosis and should never be given when acetone or

diacetic acid is present in the urine
The renal elimination in nephritics (1) without
eclamptic symptoms is not affected with spinal
or sacral anaesthesia. It might be said that
chloroform could be used with safety but we
must not forget the cloudy swelling and fatty
degeneration of the liver and kidneys and the
effects thereof 4 or 5 days postpartum. Some
will say that nitrous oxide or ethylene could be
used without hirm. Our experiments on animals
invariably show that with these forms of ares
thesia hemorrhage in the glomerulu is produced.

If pychtis or pyclonephritis occurs at the time of labor or if either has recently been present the patient should not be subjected to the harmful possibilities of inhilation anvesthesia. In fully 50 per cent of the cases in which pychitis or pyclonephritis is dormant or has subsided it will recur following general narcosis.

Severe cases of hypertension call for this form of anæsthesia and not infrequently do we see 2

permaner t drop of from 10 to 20 points after its use By carrying the anæsthetic higher in the canal 2 greater drop can be obtained if desired

Diabetes is a serious complication at best and one not easily dealt with Spinal or secral anasthesia would appear to be the only safe

guard in these cases

In the anemias of pregnancy other primary or pernicious better results are obtained with spinal anaesthesia. There is less harmorrhage at the time of delivery, no vomiting or deliv dration and the blood chemistry is not changed.

The patient with a short fit neck takes inhala tion masthesia badly but does not seem to mind spinal anestbesia. On patients suffering with gotter (5) exophthalmic or toxic adenoma spinal or local anesthesia has little effect provided adrenalnis not used. They invariably take inhalation anæsthesia badly and cardiac complications may cruse it to be absolutely contra indicated.

In cases of severe shock due to long tedious labor in which delivery has been attempted at home without success and the patient has then been brought to the hospital spinal anaesthesia may be successfully used. These patients greatly improve by the judicious and free use of ephed rine.

In prolonged and difficult labor (23) in which the physician has reason to believe that delivery will take place without instrumental interference a rest period from pain may be produced with spinal ancesthesia and the patient permitted to regain some of her strength. Not infrequently the relivation of the soft parts favors quick easy delivery

An example of this may be shown in a prima prin 3 hours in labor with the cervix dilited 3 fingers. A limited spinal anæsthesi i was given the cervix became soft and complictly dilated within 20 munutes and offered little or no resist ance to the oncoming liead. The child was delivered 48 minutes after the subaracilinoid mection and the mother was perfectly at ease. She suffered no pain, and smiled as the head advanced over the perineum.

The rigid or spasmodic cervix is little affected withinha attonanysthesia. With spinalanesthesia the cervix quickly becomes soft and flybby and offers little or no resistance to the oncoming parts or is easily dilited by manual efforts. The so called Bandl's ring or hour glass contraction is not relieved with a limited spinal anasthesia. If such a condition exists, it will be necessary to carry the anesthetic high enough in the spinal canal to anysthetize the hypogastre plevus or

to the ninth dorsal vertebra. If this is done the spasm and contraction are relieved much more readily than with inhalation anæsthesia Cases of cresarean section ruptured uteri or ruptured ectorics call for this form of anasthesia not only for the greater protection it offers the mother and child but because it eliminates to a great extent postoperative distention or ileus. The surgeon has better working conditions. There is less trauma to the abdominal wall no handling of intestines les bleeding and a shorter convalescense

Forceps are apparently applied with greater ease and extraction is accomplished with less effort. The amount of relavation and elasticity in the anasthetized perineum is almost incredible If the cervix is not fully dilated it may be manually dilated with little or no effort. The cooperation if the mother and normal uterine contractions assi t materially in the delivery There is les trauma to the child and lacerations are less and to occur. When Kurllands are use I in retropositions and the position is corrected d livery may take place vithout further instrumental aid

Versi in may be performed with greater ease The relaxed soft parts permit the insertion of large hand without any difficulty I here is no shock to the mother letanic contractions may be releved by carrying the anasthetic higher as already explained

In breech presentation (15) specially in old or young primiparæ the fate of the child i better Bro en arms an I legs are I ss apt to result and delivery can be performed with less

effort

We wish to emi hasize the softness and lack of resistan e of the cervix and the extreme elasticity of the perincum (10) because it is almost inconcervable until it is witnes ed. Slight digital pressure upon the posteror f urchette of the vaginal wall p rmit dilatation four or five times the normal si e. Lituitrin may be used safely if it is given to minute after the spinal an esthetic provided obstetrical judgment is used

The only entra in lication that would app ar to this form of an isthesia would seem to be normal delivery in multiparæ becau e these cases a ually may be carried through comfort

ably without deep narcosis

The question 'ill naturally ari e as to whether a 40 per cent novocain olution introduced into the subarachn id space will cause irritation This does not occur Before this solution was used in humans 6 dogs were injected and secondary taps made 6 hours later The cell count was no greater than when a 10 per cent novocain solu

tion was used. In fact fewer cells were observed than when a 5 per cent cocain or stoyaine solu tion was introduced into the dural sac. The lack of intradural irritation may be attributed to the fact that the solution remains in a small and dependent portion of the dural sac Its contact is limited to not more than I inch of the extreme tip of the canal as shown by \ rays (Fig. 14) or the lack of irritation may be explained in that novocam itself is not irritating to deli cate membranes The instillation of pure povo cain crystals on the human cornea was found to produce little or no irritation. Lowdered novocam was applied to the corner of animals 6 times in one day and no visible inflammatory reaction was produced The postanasthetic aspects of the nationt have been no different than when a to per cent solution was used Risacher and Waitz have used a 50 per cent solution with no deleterious results

Since the introduction of starch paste as a con trollable feature in spinal anasthesia several inquiries as to the olubility of starch or ghadin have been received and likewi e as to whether or not the gliadin might act as a forei n body Hus ean be answered in the negative Gladin is extracted from wheat starch through triple 500 mesh silk and rendered soluble before it is added to the anxisthetic solution. A detailed description of the technique of renderin it soluble and the method employed to prevent fer mentation would be too long to include in the present paper When the starch paste was u ed before gladin was employed there were frequent variations in the viscosity of the solution and suspension could not be maintained for more than o minutes With gliadin we are now able to

prevent de semination in the spinal fluid for over liours The amount of viscosity a constant and reliable and there is no tendency to variation The solution will not ferment as sometimes happens with the starch paste. It appears to be permanent and may be kept for at least I year without deterioration We do not know how

much longer it can be kept

The blood pressure is not affected becau e none of the vasomotor constrictors; anæsthetized The visomotors are thrown out from the cord with the spinal nerves from the second dorsal to and including the first lumbar and to those familiar with spinal anaesthesia it is well known that the blood pressure drops in direct ratio to the intensity plus the number of vasomotor con Stovaine cau es the strictors anasthetized greatest reaction novocum the least With con trollable spinal anæsthesia we are able to limit

the upward extent of the solution to any desired height in the Spinal canal by regulating the degree of the Trendelenburg position employed as measured by the tiltometer plus the amount of the expansion of the solution which is obtained by mixing it with the spinal fluid. Four cubic centimeters of spinal fluid mixed with a solution will anæsthetize the lumbar nerves and produce anæsthesia of the perineum and legs 6 cubic centimeters to the tenth dorsal segment anges thetizing the abdomen to the umbilious Eight cubic centimeters will carry the solution to the seventh dorsal segment producing anasthesia to the costal margin the highest arresthesia required for abdominal worl only anæsthetizing half of the vasomotor constrictors Ephedrine employed in an amount proportionate to the height of anasthesia will stabilize the blood pres sure. In sacral anæsthesia no ephedrine is neces sary and it is only used as a safe guard in case the patient should assume a position permitting the anæsthena to extend upward. When anæs thesia of the lumbar nerves to milligrams to the tenth dorsal 50 milligrams and to the sixth or seventh dorsal 65 milligrams will at all times absolutely stabilize the blood pressure

Ephedine is superior to suprarenalin in main tuning the blood pressure because its duration may be depended upon for 2 or 3 hours or until the an esthetic his become absorbed and climinated whereas the effects of suprarenalin on the visomotors will not last more than from 15 to 20 minutes and must then be reneated

The dreaded drop in blood pressure does not occur (a) Dry wounds are not observed There is as much bleeding as with inhalition anosthesia Expiratory and cardiac embar rassment does not occur. During delivery it is not necessary to administer stimulants. Saline terms are eliminated. If the technique as to the position of the patient the amount of expansion of the fluid and the use of ephedrine is observed the patient may be carned through without the slightest drop in blood pressure (Fig. 13). Not infrequently does the blood pressure rise to 20 or 30 points.

Brum says that suprarchalm made local anreathests possible That being so ephedrine has contributed much to the safety of spinal anaesthesia (16). When the blood pre sure is munitimed pailor and cold sweats do not occur Nausea and somiting we either greatly diminished or eliminated. These facts alone much the open tor more at ease and the patient much more comfortable. One author graphically states that the blood settles to the dependent parts of the body.

when spinal arresthesia is used and that the radial pulse has no clinical significance because of the relaxed condition of the arteroles and because the impulse of the heart beat is not carried to the wrist (14) in other words the patient is pulse less If Babcock (3) or Boy d(4) who together have administered spinal anisthetics 47 000 times saw a patient in a pulseless condition they would be greatly alarmed. To the inexperienced or to the one using spinal anisthesia for the first time it would undoubtedly give such a fright that he would permanently abandon it.

A report of several cases of controllable spin-tl anæsthesia by operators in various parts of the country unknown to each other and many of them personally unknown to the authors who have used this form of anæsthesia independently would seem to be more convincing than words Table I deals only with the heretofore dreaded complications of spin-langsthesia.

#### SUMMARY

In conclusion we do not wish to insinuate that spinal conduction or local anaesthesia should always be employed but past experiences have taught us that with their use we do not encounter the troublesome postoperative anaesthetic after effects such as nausea vomiting gas distention ileus acidosis pneumonia and innumerable other complications which are directly caused by in halation anæsthesia. The primary mortality is undoubtedly less whereas the secondary mor tahty (8) or in other words the mortalities that occur from one day to one week following oper ation and which are due directly to inhalation narcosis are practically nil Morbidity is reduced to a minimum. Since spinal anesthesia has been developed to the point of safety which it now enious the technique of induction has been so perfected that with these anesthetics we are able to perform any operation upon the human body with greater facility and offer better protection to the patient Today patients are not to be classed with those of a decade ago. They have been educated and enlightened not only as to and sthetics but as to obstetrics urgery and medical procedures in general through public health movements societies and the press Their knowledge must be respected Therefore we should perfect ourselves in the technique of spinal conduction and local anasthesia so as to be able to meet the demands of the public

For the development of this an esthesia in the future we will have to look chiefly to the younger men. Twenty years ago spinal and local an es thetics were rarely used. Today they are rather popular and are being more and more generally used Spinal conduction and local aniesthesia will undoubtedly increase in popularity in the next to years

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# THE IMPORTANCE OF PARLY TRACHEOTOMY

B WILLIAM II IRIOLFAU MD CLLY LAN O 110 Th Ct 1 dCl

TAPACHEOTOMY is a word which has long been associate lin our minds with exbaus tion pneumonia cardiac failure and death This association is we feel unwarranted and is due to the fact that in the rare case in which the operation 1 necessary the results are unfavor able because operation is usually deferred too long rather than because of any intrinsic fault in the operation itself. When performed early tracheotomy is very much more effective as a strength conserving and life saving measure than when it i u ed as a last resort

One of the most valuable uses of tracheotomy is to relieve largingeal obstruction which may follow an operation on the thyroid gland and it is to this type of case that we have particular reference in this paper. The obstruction in such

a case may be due to bilateral abductor paralysis either temporary or permanent when the vocal cords are approximated in the midline or it may be due to cedema of the larvax or to deep cervical hæmorrhage Other conditions which sometimes necessitate tracheotomy are carcinoma of the larynx and of the thyroid and deep cervical in

The obstruction may occur during operation or at any time after it but it almost ne er occurs after more than 60 hours When obstruc tion occurs during operation it is generally due to posture and to traction on the gland If that is the case it vill clear up very shortly upon relief of the causative factor. In the rare cases in which obstruction develops months or years after operation it is due to involvement of the recurrent laryngeal nerve in the scar tissue and in such cases the prognosis is very poor

The characteristic sign of nearly all types of laryngeal obstruction is inspiratory strider which is more pronounced when the patient is sleeping If it is of any considerable degree the patient complains of difficulty in getting sufficient air and uses the accessory muscles of respiration. The factes is anxious and often large doses of morphine fail to induce sleep. Trichycardia and werl ness of the pulse may appear early hut generally they are late symptoms especially in a calm patient with some reserve strength. Cyanosis is generally of serious significance and except in cases in which an almost complete obstruction develops quickly it is an indication that the partial obstruction has been present for a considerable length of time and that relief should have been given earlier. A strong voice which however is monotonic, is often present and may be mislend Examination of the larvnx will generally reveal the cause of the obstruction. If it is due to bilateral abductor paralysis the cords will be seen to be approximated in the midline

The complaint of the patient is the most important indication for a tracheotomy. A slight ohstruction which is borne with ease by most patients may be a serious burden to a very weak and nervous one. If the cords are seen to he fixed in the midline a tracheotomy should be per formed at once If the obstruction is of slight degree and if there is some space between the cords it is justifiable to defer the operation for several hours in the hope that it will not be neces-In this connection however it should be emphasized that delay is especially dangerous if the patient has little reserve strength. If there is any doubt it is much safer to perform the tracheotomy as the tendency is for laryngeal obstruction to increase once it has developed to any degree This tendency to increase is accounted for by the increasing congestion and cedema Many cases may clear up by the use of an ove gen tent but they should be watched very closely and if any signs of an early exhaustion are pres ent an immediate tracheotomy should be done

One of the fundamentals of present day surgery is to conserve the strength of the patient and it is just this which early tracheotomy does for when the operation is performed early the general condition of the patient has not become impaired by a long fight for sufficient oxygen the mental condition is clear and the patient is able to co-operate the cough refleves are present and are not deadened by fatigue and by large amounts of morphine and there is also a minimum of mucus in the hronch. Another advantage is that the operation can be better and more safely per formed since great haste is unnecessary.

In contrast to this is the picture seen when tracheotomy is performed late. The patient is exhausted and often exanotic and the pulse is weak the bronchi are full of mucus and the patient is unable to cough after the tracheotomy has been performed. Not infrequently so much morphine has been administered that artificial respiration is necessary after operation. There is considerable evidence to show that a long continued laryngeal obstruction predisposes to mas sive pulmonary atelectasis The operation is technically more difficult since it must often be done in haste and because the patient is unable to co operate Moreover respiration not infrequently ceases entirely as soon as the neck is extended to expose the trachea

The one objection to early tracheotomy is that occasionally the operation may be performed un necessarily. However this is rarely the case for as we said before the tendency is for lary ngeal obstruction to increase and even should trache otomy he performed unnecessarily very little harm will have been done. The tube can be removed in several hours and the opening closed while the time necessary for the wound to heal will he hut little prolonged. On the other hand in the rare cases in which the operation appears to be indicated and the tracheotomy is postponed in the hope that it will be unnecessary the morbidity and mortality are greatly increased.

In a subsequent communication the technique of tracheotomy and the after care of the patient will be described

# **EDITORIALS**

# SURGERY, GYNECOLOGY AND OBSTETRICS

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# CHRONIC SUBDULAL HEMATOMA

HRONIC subdural hamatoma is an intricranial le ion closely simulating a neopla m in its manifestation. Usu ally it is the direct result of a head injury of though in the majority of each a his tory of trauma is difficult to cheir

With the advent of the mechanical criwhich developed the first trains the motor cirand the aeroplane traumatic surgery his left the hands of the industrial surgery training to surgeon and the general practitioner. Head injuries either first ures of the skull or concussion demand immediate attention often necessitating high tilization and are classified as emergence. However, the sequence of such injurie often require more careful study and consideration.

Chronic subdural h imitom i may munifest itself at any time from 5 weeks to 10 months subsequent to the acident and its onest is so insidious and its jumptoms so protean that it is difficult to distinguish it from intracranial neoplasm. Many times the symptoms are merely those of increased intracranial pressure

without localizing signs and coma may super vene to complicate the chinical picture

Chronic subdural harmatoma i now hein observed more frequently and is being oper ated on in the early stages with excellent re sults Sometimes the history is baffling and on casual examination a deep seated intra cranial neoplasm may appear to be present A careful history and thorough examination should elicit (1) a history of head injury either slight or severe followed by an interval free from symptoms and the insidious devel opment of increased intracranial pressure (2) papillodema or a field defect and (3) sensors or motor impairment which might indicate the site of the lesion. If the site of the lesion has been determined evoluratory crantotomy I indicated and the hamatoma can be re moved completely Certain writers consider the adve ability of drainage but stati tic show that complete closure is just as success ful and avoid the added danger of secondary infection

I romasurgical standpoint chronic subdural humitomasspectacular. Itspresence 1 signified by apigmented overlying dura which on in cision reveals what appears to be anoromized blood clot in the subdural space however it differs from pachy meningit. humorrhapita interna in that its surface has not the laim nated appearance so characteristic of this condition. On pulpation it usually fluctuate and within the capsile, there is fluid of different color and consistency depending on the duration of the le ion. When aspirated the fluid resembles bile and after the cavity has been evacuated, the capsule can be stripped away from the underlying pia arachinoidleas.

ing normal appearing compressed cortex be neath

Pathologically the lesion is an organized blood clot whose center has liquelied and whose capsule shows fibrous organization interspersed with mesothelial cells which have invaded it ostensibly from the meninges These mesothelial cells have been classified as a part of the reticulo endothelial system of cells and closely allied to the Kupffer cells of the liver while the fluid contained within the hematoma corresponds to biliverdin and bili rubin resulting from the reaction of the meso thelial cells on the hemoglobin contuned within the structure. Virchow's classic de scription of the lesion in 1857 has continued to remain outstanding and his conception of the chology and the relation to the surrounding tissues remains undisputed

Because of the unequivocally successful results of operative procedures in cases of chronic subdural hæmatoma such a lesion should be considered as a possibility in the differential diagnosis of intracranial complication

Winchell Mck. Crate.

# CONVULSIONS

ONVULSIONS have puzzled the wits of men for ages. They may be associated with certain diseases with injuries or with intoviction from drugs. Uremic convulsions from urnary obstruction may be reheved by surgical measures. Care of expectant mothers may do much to prevent convulsions arising from the toxama of pregnancy and care during partuntion will do much to prevent injury to the child which may lead to convulsions. Neuro surgery has something to offer for the rehef of convulsions associated with brain tumors abscesses and injuries. There are however certain convulsive seizures that defy treat

ment or explanation These are referred to as ' idiopathic and should mark the frontier of research on the problem of epilep v Various hypotheses with regard to the etiology have been applied to idiopathic convulsions one of which is heredity. It has been inferred that natural phenomena explain such mani festations in smuch as some animals (the opossum and certain beetles) display similar behavior in defense Psychogenesis has been used as an explanation as well as unknown toxic agents supposed to arise in the course of metabolism. The endorrine glands have been suspected. There may be elements of truth in all hypotheses but from them there is little to offer the patient. The etiology is elusive and obscure

Certain choical and experimental observations of the last decade or two may throw hight on the problem. Dandy has demonstrated on dogs that injury to the motor cortex lowers the threshold for the production of consulsions. To produce scizures in dogs so injured only from one third to one seventh of the dose of ab inthe was necessary as compared with normal animals used as controls from Dandy's work it might be implied that injury to the motor cortex is probably fundamental in the cause of consulsions.

It has been found that convulsions may be induced when the blood sugar is reduced to a low level by an overdose of insulin. Wilder Allen and Robertson report the case of a man who became unconscious when he became hungry. If he was not relieved by the ingestion of sugar or (andy convulsions developed. The blood sugar was extremely low during unconsciousness. He became progressively weaker and died. At necropsy it was found that carcinoma of the islands of Langerhans hid metastasized to the liver and lymph nodes. Extracts of the metastatic growths injected intravenously into a rabbit

caused marked reduction in its blood sugar In another case a young slender rapidly growing high school girl for cosmetic and athletic purposes abstained from eating a sufficient amount of food and light convul sions developed when she awakened in the morning The blood sugar was low was given a lump of sugar each morning on awakening together with sufficient food dur ing the day and the convulsions disappeared

There are various ways in which diet has

been regarded as a fa tor in health and dis-

case. The importance of the ketogenic diet for the relief of convulsive seizures e pecially in childhood is attracting much attention Ben ben a discuse of the nervous system seems definitely traceable to dietary defi ciency Pellagra and permicious anemia both diseases in which the nervous system may be affected have been regarded as deheiency diseases they re pond somewhat to dietary treatment I rom the standpoint of diet probably no observations are more significant than those of Hughes who reports a disorder of the nervous system invariably produced in young pigs by a diet free from vitamine 1 The syndrome consists chiefly of ataxia blindness paralysi and convulsions Only partial recovery takes place when the diet is correcte 1

Hughes work suggests the effect on the brain of the fetus it the mother do s not get

enough of vitamine A by reason of the season locality capriciousness of appetite or hyper emesis gravidarum But even if the child fares well before birth and is not injured at birth in early childhood his brain may have to endure for various reasons the insult of improper food and through life suffer the defect. Thorn found that convulsive seizures began before the age of four in 51 per cent of epileptic cases He quotes from Elliot who found that fewer convulsions developed in cas s of rickets treated early than in those untreated

In summarizing it may be said that idio pathic epilepsy is probably due to injury to the brain which enables smaller insultin agents to induce convulsions. Injury prob ably occurs early in life and must be insidious and obscure to escape detection. In the li bt of recent work on vitamine deficiency the h alth of expectant mothers and the food of children should be given every consideration to prevent the type of injury to the brain that never can be repaired

LLOYD H ZIEGLER

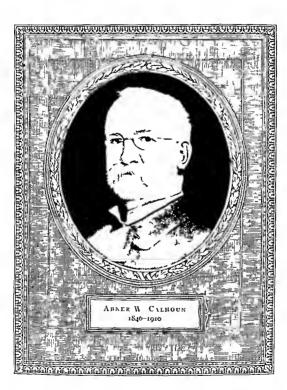
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# MASTER SURGEONS OF AMERICA

### ABNER WELLBORN CALHOUN¹

T is altogether fitting and proper that the memory of Dr. Calhoun should be enshrined in the Abner W. Calhoun lectureship foundation. His achieve ments as citizen soldier physician and teacher constitute a distinguished chapter in the chronicles of the history of this great state and add luster to the records of many other notable accomplishments of which you are justly proud

Dr Calhoun was fortunate in his parentage and the guidance thus bestowed and the register of the events of his life portrays the unfolding and development of his sterling character and his resolve—to do the work in hand with scrupulous and unaffected dignity—freely and justly

Introduced by his father to the study of medicine he matriculated in the Jefferson Medical College of Philadelphia and was graduated as the honor man of his class well high 60 years ago. Lispecially interested in the study of anniomy in his student days he continued that interest when he went abroad shortly after his graduation. Attracted by the eminence of Hertel he spent all available hours in his dissecting room where indeed for a time he was his prosecutor. During this period he was offered the chair of anatomy in the Atlanta Medical College. How better could he have laid the foundation for his future career as a notable exponent of one department of special surgery, wherein he was destined to attain a prominent place thin by acquiring proficiency in this important fundamental branch of the medical sciences.

Doubtless influenced by his father he realized the necessity of gaining specialized knowledge and experience in ophthalmology and otolary ngology and with characteristic energy and ambition sought and obtained instruction in the clinics of the masters of those days in these departments of medical and surgical work.

Fully and admirably equipped he returned to his own home and was elected professor of ophthalmology and otolary ngology in the Atlanta Medical College of which his father had been one of the founders. He continued with praise worthy ability to fulfill the duties of this distinguished post until the day of his death serving not alone as teacher, but as administrator, and in all the ways he was able admirably strove for its development and improvement.

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His succe is was immediate and there gathered about him an extensive chentele the most extensive this Southland has ever known. From far and wide his patients came seeking the help of his clinical and his operative skill, and no one nich or poor, sou, hit this benefit in vain.

His commanding presence his distinguished personality his utter friendliness his high ideals. his balanced judgment his untiring energy. his manual devienty—the e were the assets of this gifted man pent with line liberality for the advantage of his adorne, patients and of his admiring students.

Hi was the hand which restored to countless hundreds the priceless heritage of 1ght. He had his hie abundruth. Of hum it may be stud as it has been said of 1nother great physician the very name of him was Victory.

Deeply concerned with the obligations and re-possibilities of medical and surgical practice he none the les-found time to accept and fruthfully to perform the dutie which pertain to organized medicine to teach to the eminent satisfaction of his students to contribute liberally and efficiently to the literature of the Department of Medicine and Surgery he so well adorned to engage effectively in public affur—and to be an outstanding citizen imbued with the spirit of evic righteousness and of business rectitude.

He was a great physician and a great gentleman. He belonged to that rare group of men who find hidden joy in every perfect ervice and who give fine example of the conduct of the busher life.

In my early days long ago it was my privilege to visit Dr. Culhoun. This was a happy circumstance in my life. The impressions then graned have never failed. I am honored in the opportunity of paying him tribute, albeit inadequately framed and spoken, but I pay it reverently and in that reverence I know you ion.

I quote some recently published lines somewhat altered in their relations and vet appropriate

```
Adwh he lkdh th td f
Wh I at I roat fi lad
II k th I d dl ld tsh o h gh
TI drt ll li od
M h ly ta htth h
He tb f g tt n l y h o
```

G E DE SCHWEINITZ



# THE SURGEON'S LIBRARY

# OLD MASTERPIECES IN SURGERY

BY ALFPED BPOWN M.D. TACS OMARI NEBRAS A

# THE SUCCENTURIATUS ANATOMICUS OF

TVIIC mystical superstition that the brain is the home of the human mind and soul line been handeddownsince the dawn of time Evidence of this belief is found in the skull showing herled tre phine openings which have been found in prehistoric burial places in many lands the widely separated countries from Peru to France and Japan to Portugal showing the general prevalence of the idea Naturally we cannot be positive that these early skull operations had to do with such a belief but if we start from the premise that this was the idea of the early trephining operations of which we have knowledge and reason from this it seems fair to assume that they were performed for some abnormality that had to do with the psychic rather than the physical side of the nationt Broca suggested that in addition to the superstition that the ego resides in the brain there was also a religious element in the operation so that it partook of the nature of a religious ccremony. The patient when and if he recovered became evalted to the status of a holy individual Later demonology appeared and played its part in human philosophy In insane man was presumed to be possessed of

devils which had their dwelling place in the brain leain the trephine came into use as a means of liber uting devils. These various theories called attention to the brain as the most important element in the human make up.

Such a condition of affairs brought the diseases and injuries of the skull and brinn into a position of great importance and mide them a most alluring subject for the surgion who happened to be some what philosophically inclined Hipporrates devoted himself to this specialty of medicine and left his treatise on finjuries of the Hrad in which however as shown by the title he confines himself to traima alone. After Hipporrates nearly every surgeon who wrote anything at all had something to say on the subject of head injuries but little new was offered until Berengarius published his treatise in 1518.

Peter Panw was born in 'Imsterdam in 1564 and took up the study of medicine when he was only 16 vars of age beginning at the University of Leyden Upon the completion of his course he took up post graduate work in the famous schools at Panis Orieans I ostock, and I adua until he was called back to 'Imsterdam' by the tilipess of his father. At

these various schools he came in contact with many of the great men of the day. Heurinus Bontius Justus Lupsius Dodeneus Brusecus and I abricus of Acquapendente. By the time lic reached Paris he and evidently made up his mind to devote himself to matomy as his main objective for he continued that study both in Rostock, where he guined his doctorate in his twenty third year and in Padua.

Upon his return to Holland he became the professor of anatomy and Botany at the Univer ity of leyden Holland lagged behind the other countries that Paaw had wisited in that anatomy was still considered as a theoretical subject and part of philosophic medicine. Paaw evidently changed the custom for we find that in 1507 the University built an anatomical theater and the following year the government of Holland granted to the professor of anatomy the right to dissect the human body. Of this privilege Paaw tool, advantage and in 2 cars dissected following the professor of anatomy legic Paaw tool, advantage and in 2 cars dissected

60 human and many animal bodies

Though Paaw s writing was largely along the line of anatomy and his principal worls Printing anatomica First Finits of Anatomy Concernin the Bones of the Human Body in 1613 and his re editing of the Epitome of Vesalius in 1618 were purely anatomical he did apply his anatomical research to the subject of fracture of the skull and publish d his book on the subject in 1618. He bases this nork on Hippocrates. Wounds of the Head and the first four chapters of the eighth book of Aurelius Cornelius Cefsis upon the diseases and injuries of the bones and nonte

In this work Poars has applied his knowledge of anatomy both normal and abnormal to explain the diseises of which Hispocrates and Celsus write and adds his own commentaries in correction of errors where he thinks it necessary. The most striking part of the book is the collection of copper plates which he uses to illustrate the various forms of lesson of the skull and the instruments used in crainal surgery. These are evidently the work of a master engraver for they are beautifully done and due evidently to Paaws car ful direction are in great measure, correct

It would hardly be fair to dismiss the Succenturia tus Anatomicus without calling attention to the copper plate portrait of the author which shows him as a typical Hollander in ck ruff and all who may have posed for one of the heads in a painting by Rem hrandt or Trans Hals

#### REVIEWS OF NEW BOOKS

EVERY student of medicine must at frequent in relati cly larg group of patients the complain of dyspeptic symptoms not typically ulcer or gall blad | r n type but equally d stress g and disable g Th laboratory methods of diagnosis fier httle d ag ost c ass ta c Many of these patients have he s bj et d to a cholcevstectomy or in appen ke tomy a d ot a f cas s the symptoms have re m in d unabated and not infrequently have been gg avated. This u fo tunate patients are usually t rni d n ura th ni s and ar cast loose to fall nto the ha d of ome cult or what is even worse into the hands of an unscrupulous surg on he bg s a se s of operations which ar planned without r ason or co scienc. The fault must be lad at the doorstep of the m dical prof ssion be caus of the lack of interest a d perhap lack of p st ki g and judgious study of the gastre intestinal tract The duod num of which so littl s k o n has b almost uniformly conceded to have but one noteworthy disease z ulcer From t me to time perti tat les to the contrary h ve found their way into the liter ture but it seems the t the r importa c h s of be n heeded by the p of ssion

Som yea s ago the re ie er b came inter sted n the study of d odenal obst uction and allied conditi s dit therefor most gratifying for him to be allowed to pass 1 dgment on the recent tra sla tion by Qu of the little monograph on the duo d um by Duvil and he associate What of duodenal compress o t diagnosis symptoms and tru tme t can be heartily subsc bed to Fur th mo e the authors des ption of Essential and Stenosing Per duodenitis is ccu ate and pertine t a d mu t be consid red seriou ly by the prof s on Their descript on of the d formed duodenum due to adh a ons which enmesh it is most int r sti g d conforms to the reviewer's oninion Th symptoms are not pathognomenic but sugg s t e It finally b com s the task of th roentg nolo gist to confirm the diagnosis There is no questi n but that the oentgenol gir I studies of the gastro int sti I tract must be co ducted with intellig nee

d netrest and ot as a stereotype procedure gound out ars by a technician and hastily nt priced by the rocinge ologist hoss so e to nig a d thin sol anoth r. So long as such studes co ti u no ad ancement vill be made. The authors lay great sit is upon carefully conducted roentgenological studies of the duodenium special care being used to observe its size sbape position in relation to the stomach its emptying time r vers peristals contour vith character of the deformity and the lkc. From these obs r ations they have be nable in many instances to differentiate intins c

THY D NO M RAD AND S SED B P D IJ Ch I R dH 1668 1 1 dby F P Q MD S Lo Th C M by C m y 8

disease of the duodenum from periduodenal adhe sions and band causing compression and deformity with stasis

This small work is intensely interesting and should be read by every practitioner of med cine. In a single small volume can so much starting and value able information be found information which i of vital importance to the practitioner. The authors deserve much credit for presenting their observations to the profession and honor is due to Quan for placing in our hands an excellent translation of a much needed work. Journ 40 pres.

THIS small manual of surgical anatomy by Whittaker is a will printed text illustrated with some what over a hundred well chosen diagrams and dra inc

While it is not so extensive as many bools of a similar nature its britts results rather from carful phrising than from omission of important subject matter. One gains the imprission to the book r pr sents a competent teache—selection of sent tal anation cal data culled from years of a prener. The subject matter is taken up in the traditional English form a done can recognize the if eace of Cunningham on almost every page. The book is hardly one for the beginnig med cal student but can be sincerely recommend d to the surgeous difficults at the control of the control of the total or the can be sincerely recommend d to the surgeous difficults at the can be sincerely recommend.

THIS small volume on postmortem appearances vas ritten by Dr Joan W Ross securoras stat pathologist to the Roval Free Hospital and lecture in pathology in the London School of Medine for Women The authors object was to describe the chef anatomical changes found in the commoner descases but it as not intended that this describes the on should talk the pil e of practic I expert co

The general practitio er who may be called upon to make an occasional autops; will find it a useful gu de as to what h should look for And the st den who habitually e. sults tin the postmortem room vill be able to tell vith the least po sible trouble when the case before him conforms to type how it is abnormal. With these limit at one of nitely in m nid. Dr. Ross has produced a book that will be useful to those for whom it is a tended

In an introductory chapter the author discusses the characteristic appearances after death from as plus a from syncope a din coma the techn que of performing a postmortem e aminatio and the methods i preserving specimens for hi tological examination and for miscum use

Throughout the emaning sections of the volume a definite order is rather rigidly followed. First the section of

external appearances of the body are described. As an example the following under Gastric Carci noma may be cited - External Appearances The body is that of a man between 40 and 60 years of age There is anæmia with a yellowish tinge of the skin sometimes jaundice may be present Emaciation may be extreme There may be swelling of the ankles Secondary nodules of growth may be present in the skin of the abdominal wall After such a brief summary of the more common external find ings the internal appearances are considered by systems of organs The lesions found in different diseases are named rather than described as for example cloudy swelling fatty degeneration infarc tion etc Inasmuch as the description of these con ditions can be readily found in the usual textbooks of pathology the brevity which this method permits is probably a gain in that it avoids the confusion incident to too much detail. At the end of the vol. ume are five appendices giving the average normal sizes and weights of organs the length and weight of a fetus at different stages of gestation the approxi mate weight of the organs of a newborn child the dates of ossification of the principal bones and the ages of eruption of the teeth

This volume is pocket sized well bound and printed on good paper without gloss. The typog raphy is clear and the headings of paragraphs are so arranged that they readily indicate the co ordina tion of the divisions of the subject being discussed This book will not be of any particular interest to one who has had an extensive experience in post mortem examinations but to those for whom it was primardy intended it will serve as a clear brief and on the whole accurate guide to the proper perform ing of an autopsy

# BOOKS RECEIVED

Books received are acknowledged in this department and such acknowled ment must be regarded as a suffic ent return for the courte y of the sender Selection will be made for revi w in the intere ts of our reade s and as space

Biologie und Pathologie des Weibes ein Handbuch DER FRAUENHEILLUNDE UND GEBURTSHILFE By Jo ef Halban and Ludwi Seitz Lieferung 44 Berlin and

PREVENTIE MEDICAL PROPERTY OF THE ABOURD AND OF THE ABOURD BY GEORGE M DIGHT OF THE ABOURD BY GEORGE M DIGHT OF THE ABOURD BY GEORGE M DIGHT OF THE ABOURD BY GEORGE B MS CPH 3d ed rev Philadelphia and London W B Saunders Company 19 b

AN INTRODUCTION TO EXPERIMENTAL PHARM (COLOG) By Torald Sollmann M D and Paul J Hanzlik M D Philadelph a and London W B Saunders Company

A TEXT BOOK OF FRACTURES AND DISLOCATIONS COLURNG THEIR PATHOLOGY DIACNOSIS AND TREAT MEYER BY bello g Speed SB MD FACS 2d ed enlarg d and rev Philadelphia Lea & Feb ger 1928

REQUISITES AND METHODS IN SURGERY FOR THE USE OF STUDENTS HOUSE SURCEOUS AND GENERAL PRACTI HONERS By Charles W Cathcart CBE and J N Jackson Ha tley OBE Ldinburgh and London Oh er & Boyd 1928

BULLETIN OF THE NATIONAL RESEARCH COUNCIL. The Coroner and the Medical E am ner Issued under the Auspices of the Committee on Med colegal Problems By o car T Schultz and E M Morgan With a Supplement on Medical Testimony By E M Morgan Washington The National Research Council of The National Academy of Science 19 8

DISEASES OF THE EAR NOSE AND THROAT MEDICAL ND SURGICAL By Wendell Chri topher Pb llips M D thed rev Ph l delphia Γ A Da Company 1928

SURGICAL DIAGNOSIS IN TABULAR OUTLING FOR AUthorized Translation with Additions and Note By Edward L Bortz MD With an Int oductory Note By John B Deaver MD Publidelpha F A Day Philadelphia F A Davi Company 1928

A PRACTICAL MEDICAL DICTIONARY By Thomas Lathrop Stedman AM M D 19th ed rev New York William Wood & Company 9 8

INTERNATIONAL CLINICS A QUARTERLY OF ILLUSTPATED CLINICAL LECTURES AND ESPECIALLY PREPARED ORIGINAL ARTICLES ON TREATMENT MEDICINE SURGERY LTC Edited by Henry W Cattell AM M D with the col Edited by Henry W Carteii A M M D with the collaboration of others Vol m 38th senses 19 8 Phila delphia and London J B Lippincott Company 1928 RECENT DEVANCES IN SUBSERV By W Henca e Ogitive M A MID M Ch (Ovon) FR CS Eng Philadelphia P Blakatson S on & Co 19 8

A TEXT BOOK OF SURGERY FOR STUDENTS AND PHYSI CIANS By W Wayne Babcock AM M D FACS Pb ladelphia and London W B Saunders Company

Annals of Roentgenology a Series of Mono GRAPHIC ATLASES Edited by James T Case M D Vol vu — Urological Roentgenolory By Hugh H Youn M D and Charles Y Waters M D New York Paul B Hoeber Inc 1928

SINUS THROMBOPHLEBITIS INFLAMMATORY DISEASES OF THE VENOLS SINUSES OF THE DURA MATER By Alfred Braun M D New York Paul B Hoeber Inc 1928

AN INDEX OF DIFFERENTIAL DIAGNOSIS OF MAIN SYMPTOMS BY VARIOUS WRITERS Edited by Herbert French C B E (Military) M A M D (Ovon) I R C P Lond 4th ed New York William Wood & Company

DIACNOSTISCHE UND THERAPEUTISCHE IRRTUEMER UND DEREN VERHUETUNG CHIRURGIE Edited by Prof Dr J Schwalbe Vol 17 Leipzi Georg Thieme 1928

# AMERICAN COLLEGE OF SURGEONS

#### INAUGURAL ADDRESS

#### CLINICAL MEDICINE AND SURGERY IN EVOLUTION OF RULATION TO THE PRESERVATION OF HEALTH AND LIFE!

B IRANKIIN II MARTIN MD IRFSID ST C CA C ILL

#### INTRODUCTION

O greater honor can come to a surgeon than to have conferred upon him. of the largest and one of the most influen tial surgical organizations of the world-the American College of Surgeons My friends from the bottom of my heart I thank you for this dis tinction though I must confess I consider myself unworths to occups a position of such respon

In my aldress I shall attempt to portray the present evolution of the ART and SCIENCE of medicine and the part that our profession and the pubhe should have in guiding its successful progress I shall review the efforts the American College of Surgeons has put forth and will I trust continue to put forth to aid progressive co operation be tween the profession and the public in this im portant movement-the preser ation of health and the increased happiness of humanity

#### II THE AMERICAN COLLEGE OF SURGEONS

Those who visualized the American College of Surgeons organized it and have been responsible for its administration realized from its inception that just to organize another surgical association just one more academic society was not a reason to warrant its creation. The College to justify its existence would have to assume the responsibility of building for broader science for more worth; practice for interest in sustaining the traditions of the greatest profession and by the example of its Fellows and through open discussion impress upon the public the significance of scientific medicine as the ONE AUTHORITY qualified to main tain the health and insure the wholesome living of all people

#### III OUR CREFD

It was a bold announcement—the declaration by the Founders of the College at its inception

that not only would the standard of surgery b elevated but the public would be admitted into the confidence of the profession and the aid of the public solicited to accomplish the ambitious pro gram of the College Conservatism and conven tionalism within and without the profession asked in astonishment Is it possible that this group of men is actually serious in advocating so re olutionary a program?

On this the fifteenth anniversary of the exist ence of the College I venture that the profession and the lasts in the United States and Canada are prepared to answer that query in the affirmative and to acknowledge that the American College of Surgeons a fully justified in assuming that its leadership i reco nized not only as progressive but safe

# IN THE AUTHORITY OF SCIENTIFIC MEDICINE

Amon, the learned professions medicine has no equal in lon evity in continuity in ideality in disinterested service and in accomplishments For twenty five centuries medicine exhibits a clear history Its spiritual and moral creed—the Hip pocratic Oath-announced at that early be in ning has been and is as fundamental in the guid ance of the true physician as the Sermon on the Mount (first uttered five hundred years later) in the guidance of the true Christian Spiritually morally and scientifically in all civilized coun tries scientific medicine is outstandin, ly the reco nized authority in the prevention and cure of disease Like the great religions of the world it recognizes no geographical bounds but unlike the great religions it has no division of authority

A recital of the long chain of distinguished men of medicine with many links centuries lon re reals an unmistakable continuity them individually is to count the beads of a great rosary one by one each bead a jewel of rare worth and beauty It is a record of singular interest

Every physician is assumed to have a knowledge of this history but he should know it accurately and for protective information the cultural education of each person—man woman and child should include facts of medical history.

#### V WE SHOULD BL DEFINITE

I or centuries the ART of medicine was paramount. This art was based on records which represented careful study of diseases the effect of drugs and the performance of operations in dire emergencies only. Familiarity with the action of drugs was discovered and developed to an aston ishing, degree of exactness and the proficiency with which the experienced practitioner influenced the different shades of diseases would excite the admiration of the skilled practitioner of our present ultra scientific age. Like a master musician the physician of yesterday studied and knew his organ and no note was too subtle for him to reproduce.

# VI SCIENTIFIC MEDICINL

The nineteenth century saw the development of the pure sciences Rapidly these were absorbed by the medical profession and now more than ever we may say that we practice the SCIENCE as well as the art of medicine. Long experience in recorded observation is not the only basis of our accomplishments but as well the mathematical certainties of pure science and its instruments of precision.

During twenty five years I have had an unusual opportunity to ob erve the rapid changes in the development and practice of clinical medicine and surgery Besides the practice of surgery this experience was gained in five activities organizing and administering Surgery Gynecology and OBSTETRICS developing the Clinical Congress of Surgeons founding and conducting the American College of Surgeons responsibility of organizing the lay medical corps for service in the Great War and reorganizing the Gorgas Institute of Tropical and Preventive Medicine In the development of these five important activities. I have been intimately in touch with the profession and as an innocent bystander. Thave accumulated knowledge and not a few notions about the present evolution

It is my purpose this evening to review some notable events from a mass of material that has been systematically compiled and placed in manu script form whose reading would be interesting but whose presentation in an address would be appailing

First and foremost are the scientific accomplish ments that have definitely modified and controlled specific diseases and incontrovertibly conserved life and health in a revolutionary manner work of Pasteur and its adoption by Lister in the development of antiseptic surgery the outstand ing pursuits of Koch in modifying tuberculosis the cooch making researches by Behring Roux and Klebs in controlling diphtheria, the indefati gable labors of Ehrlich in furnishing a remedy for the spirochatal di cases the achievements of Roentgen of Eberth in well nigh exterminating typhoid fever the painstaking accomplishments of Bruce in sleeping sickness Ross and Laveran in malaria our own Reed Finlay and Gorgas in sellon fever Banting in diabetes and the Dicks in scarlet fever. These specific accomplishments have resulted in saving more lives each year than were lost in the Great War

# VII DEGLERATIVE DISEASES OF MIDDLE I ITE AND OLD AGE

There are certain other diseases that reap a large death harvest and a much greater disability Though we have not a specific for each we have definite proof that they may be modified or cured if discovered early These include the degener ative diseases insidiously begun in middle life and exaggerated in old age notable among them cancer with a mortality of 115 in every 1 000 deaths though if recognized early it may be cured heart disease that makes its deadly swath in individuals in the most productive period of life 140 to every 1 000 deaths may be modified if early recognized and appropriately treated diseases of the kidneys and blood vessels with their harvest in middle life of 110 in 1 000 deaths Preventive medicine or the early application of curative measures in these diseases would save thousands of lives each year

So to extend longerity to any material degree we must first discover the cause of and secure a remedy for degenerative diseases. It is my proph ecy that we are on the eve of solving the unknown problems which pertain to the diseases that cause unforeveen and unexpected tragedies in middle life and that germinate and foster the dread of incapacity in old age.

The degenerative diseases cause one third of our deaths. They are definitely influenced by concurrent incidents as habits of living strenuous mental activities improper diet excessive use of stimulants particularly alcohol lack of proper exercise and recreation and infectious diseases that thrive on a weakened resistance. They are the result of age or its equivalent—excessive work

Within a year at the Third Race Betterment Conference President C C Little of the Univer sity of Michigan stated

# AMERICAN COLLEGE OF SURGEONS

### INAUGUR VI ADDRESS

# THE EVOLUTION OF CLINICAL MEDICINE AND SURGERY IN RELATION TO THE PRESERVATION OF HEALTH AND LIFE!

BY TRANKLIN II MAI TIN MID I SIDENT CHI ILL NOI

#### I INTRODUCTI N

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### XII WHO RESISTS THE BENEFITS OF SCIENTIFIC MEDICINE?

Though it be impossible to speak with exact ness it is a safe assumption that of the 130 000 000 people in the United States and Canada one half of those of reasoning age have no familiarity with the simplest fundamentals of the laws of health While this proportion of our population is ignorant of the importance of health laws it is again a safe assumption that false teachings by propagandists and one or another reasons have led at least another one fourth of our reasoning population to develop a positive antagonism to scientific medi cine and definite resistance to its services. Those who oppose scientific medicine thrive more or less successfully according to the advertising zeal of their leaders they represent the various sects cults and organizations of proprietary and patent medicines

# NII RESILTS OF THIS RESISTANCE

If it is true that one fourth of our population of reasoning age represents active opposition to curative medicine and succeeds in avoiding its ministrations here is a sound basis on which to estimate the effect of this on the health and mortality of the whole population

Thus our favorable showing is possible with non resistance or indifference of one half of the population of thinking age Fstimating that one of every four resisted the services of scientific medicine-refused vaccination for smallpox anti toxin for diphtheria and appropriate prophylaxis in the other preventable diseases—a large propor tion of the present death rate in these diseases is avoidable and may be attributed to this resistance An ultra conservative estimate (under accepted methods of statistical study and mathematical calculations) will attribute to this one sin of omission 8 790 6 avoidable deaths in 1925 and 87 006 avoidable deaths in the ten years rors to 1025

With one fifth of our population yielding to and accepting an annual health audit (as our figures indicate) with two thirds of them sym pathetic to curative medicine and with two thirds spiritually and morally in favor of the en forcement of the r8th Amendment we need not wait until the next decade or the next century to reap the benefit in life extension

### XIV EDUCATION IS NECESSARY

I be remedy is but too obvious. There must be continuous education The fundamentals of scien tific medicine its practicability and acceptability should be taught in the primary classes of our public and private schools as early as the seventh or eighth grades The fundamental principles of scientific medicine should occupy the same rela tive position of importance in the grade schools as grammar general and physical geography lower mathematics and English literature. The in fluence of these principles on personal and public health should be emphasized and resterated and knowledge imparted of the laws of general hygiene and sanitation

A number of experiences in addressing school children convince me that education in the basic principles of scientific medicine would be accepted by them with great enthusiasm and the leaven there sown would be of incalculable aid in lessen ing the existing ignorance and indifference toward the maintenance and promotion of better health Morcover in a dignified and proper manner it would be a potent factor in combating misinfor mation which uncurbed develops into opposition

to the truths of scientific medicine

The five million men who served in our armies in the Great War were quick to appreciate the im portance of the policy of our medical department to KEEP THEM WELL The demonstration in the armies of our allies and enemies was even more impressive as their men were under scientific medical surveillance for longer periods. So as tounding were these demonstrations that practically every country engaged in the Great War (excepting of course the United States) was forced by public opinion of their soldiers to add to their respective cabinets a portfolio on medicine under whose supervision curative medicine was made accessible to all neonle

# V FERIODIC HEALTH EXAMINATIONS

Freventive medicine and its counterpart pen odic health examinations have been discussed since the earliest days of medical science. If scientific medicine has established its right to assume the responsibility of supervising and main taining the health of the people it is a foregone conclusion that it should examine each and every individual at definite intervals and give advice based on the findings

Resistance to this obviously significant policy is a sin of omission due primarily to the short sightedness of the physician who is educated in and practicing scientific medicine and secondly to induference of the public which is the bene ficiary of such a policy

This subject has been much in evidence in the last ten or more years \o one group of physi cians no one organization alone can successfully influence this change

The m tool titl of bith tim naae g d at filfe is bg e d Themang ty of stat teal d in do rvt n p t that die too Making the e ge gefof m nilfe 68 rpoor; there may be ge gefof m nilfe 68 rpoor; the c may be ge gefof m nilfe 80 rpoor; the c may be gefof to m to the upper agel m till the toom k wm m mag f humb bigsad tim k t il y comm the gatin that g w ldm nilh tw w ldh too iendo pole s, p s k m lijs. All the gatin that g w ldm nilh tw w ldh too iendo pole s, p s k m lijs. All the gatin that g w ldm nilh tw w ldh too iendo pole s, p s k m lijs. All the gatin that g w ld it is half to make the difference of the great pole s to the difference of the great pole s to the difference of the great pole s to the difference of the great pole s to the difference of the great pole s to the difference of the great pole s to the gr

It is my belief that this statement was dangerous as it was put forward by an influential teacher of men and women It i an opinion of a pure seen tist who be as his statements on accepted and established scientific facts but we are reminded every day by the world's progress that so called scientific facts are not necessarily permanent facts Frequently they have been are being and will have to be revi ed as knowledge is sugmented

and experience advanced

Dabetes is the result of degeneration of gland issue in which is secreted a substance that aids in regulating the absorption of sugar in the circulation. Dr. Moses Barron of Minneapolis in an article in SURGERY GANGCHOGY AND DESTERIES revealed a method of isolating that secreting itsus. Barron sarticle was read by another (then obscure) student whose mind was not cluttered with scientific facts that dimined his vision he rushed across the Atlantic placed his conclusions before his laboratory teachers in his Alma Mater in Toronto and gave to medicine Insulm a remedy for diabetes one of the great discoveries of the

Would Edison if he were told that the degener attve diseases were said by scientists to be un modifiable say Well then we must greet up? Wouldn't he say that many things are being wrought every day that seemed impossible of accomplishment in the light of science and tradition?

The science of chemistry endocrinology but ology physiology clinical pathology and basal metabolism is trickling and solving new problems every day. Adrenalin thyroxin insulin and putitin are examples of exact and progressive accomplishments. Undoubtedly the substances that will control the degenerative diseases are now in the making

Scientists today are mining the materials men of vision are fitting these materials into practicable theories and practical men are straining at their leashes ready to utilize these material and make great visions come true

#### VIII PUBLIC HEALTH

We know to a mathematical certainty the contributions of scientific medicine toward public health (in contradistinction to personal health) in comprehensive by greine regulations and general santiation. The findings of scientific medicine through civic and other governmental authority are applied to purify the water supply to dispose of sewage to protect and conserve the purity of food to ventilate public buildings and places of amusement—gifts which the lay public has accepted almost unanimously, and all civilized countries realize the event to which life is protected and wholesome living insured through the Provisions of scientific medicine.

#### IX SUMMARIZED STATEMENT

Thus briefly the ever lenothening list of im pressive accomplishments reads like a romane To physicians it i an old story with many side lights endless in their ramifications. To the lay man and woman its history written in propilar style would be not only intensely interestin rasing but it would be more valuable in stimulating race betterment and human happiness than an biography ever written.

#### THE HERITAGE EMPHASIZES OUR SINS OF OMISSION

Ours is an unique heritage from a most anominad accomplished profession. Are we as trusters doing our utmost to perpetuate and extend these doctrines? Is the public unmindful of its legar, through ignorance indifference or false teaching? Whose is the paramount responsibility to supplied ignorance with knowledge indifference with in terest and false teaching with truth? The practitioners of medicine themselves!11

# VI SCIENTIFIC MEDICINE AND PERSONAL HEALTH

In my review I have endeavored to ascertiam what would be the result if the doctrines of scient in medicine were applied in a maximum degree toward the conservation and preservation of personal health and toward the alleviation and cure of evisting disease. It must be obvious that the effect in prolonging life would be phenomenal and in extending wholesomeness of living and happiness in pursuit of life inestimable. Our past and present methods have confined our activities to curative medicine almost to the exclusion of preventive medicine.

# VII WHO RESISTS THE BEAUFITS OF SCIENTIFIC MEDICINE?

Though it be impossible to speak with exact ness it is a safe assumption that of the rao ooo ooo people in the United States and Canada one hulf of those of reasoning age have no familiarity with the simplest fundamentals of the laws of health While this proportion of our population is ignorant of the importance of health laws it is again a safe. assumption that false teachings by propagandists and one or another reasons have led at least another one fourth of our reasoning population to develop a positive antagonism to scientific medicine and definite resistance to its services. Those who oppose scientific medicine thrive more or less successfully according to the advertising zeal of their leaders they represent the various sects cults and organizations of proprietary and patent medicines

#### XIII RESULTS OF THIS RESISTANCE

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mortality of the whole population Thus our favorable showing is possible with non resistance or indifference of one half of the population of thinking age Estimating that one of every four resisted the services of scientific medicine-refused vaccination for smallpox antitoxin for diphtheria and appropriate prophylaxis in the other preventable diseases—a large propor tion of the present death rate in these diseases is avoidable and may be attributed to this resistance An ultra conservative estimate (under accepted methods of statistical study and mathematical calculations) will attribute to this one sin of omission 8 790 6 avoidable deaths in 1925 and 87 906 avoidable deaths in the ten years 1915 to 1025

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public and private schools as early as the seventh or eighth grades. The fundamental principles of scientific medicine should occupy the same rela tive position of importance in the grade schools as grammar general and physical geography lower mathematics and English literature. The influence of these principles on personal and public health should be emphasized and reiterated and knowledge imparted of the laws of general hygiene and sanitation.

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# V PERIODIC HEALTH EXAMINATIONS

Preventive medicine and its counterpart periodic health examinations have been discussed since the earliest days of medical science. It scientific medicine has established its right to assume the responsibility of superviving and main tanning the health of the people it is a foregone conclusion that it should examine each and every individual at definite intervals and give advice based on the findings.

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This subject has been much in evidence in the fast ten or more years so one group of physicians no one organization alone can successfully

influence this change

I am indebted to James A Tobey Administrative Secretary of the National Health Council for the following brief history of the movement

Pd mut folie u ggetd tt 8 by D D bli I glad la I thigh t ged them m tw ty g th gl tl td of 1h otaStt D ( ge M Cold [Ph] d lpl a d pted tthe tm I tl 1 d gul r li la i m t of p tly well d I \dhtplfilf m dt l b B wh h 1 d 1 d lot рпd h l m t n fa hm tl I n 3 W.3 d tlf t t n fl f ln de 1 Ti ditif t fwh hDige I dt to htt lyhld lt ti m d pt th pl £ tf t y fth T Is a 4 D S S C ld t 1 1ak C mm n H lu ( \ Y ket n du tabl hme t f tm m g ti mtl ftl Citm t Th lt l) If M Bgg C mm ftl Ctv If lth D k St t fl ltl fip tm t 1 1 ď 1 ıç tilpp ill that le lWLW hat DC Ma ighd t pith hith ı tl t ptth h lth 1 1 p bl h altl f tw A t y tn ltlglt l Clakpbihd pp lfH i Hd II D H F M k lJ W t n I t 9 3 Dr // 1" h 1 } th J Sh ptd it f m t d t Phy 1 l thg 1p 11 1 m t 1 11 d ... lf pr t gb LfEt

Practical work alon this line has been enthu siastically developed by the Metropolitan Life Insurance Company

Special emi public organizations conspicu ously the Vational Tuberculosis Association and the American Soci ty for the Control of Cancer the former twenty four years ago the latter six teen years ago began to urge periodic health examinations so that the signs of the respective disea e in which they vere interested might be disco ered early and later their example was followed by the American Child Health Associa tion the American Social Hygiene Association the American Heart Association et cetera Nat urally it soon became obvious that preventive medicine could be more systematically advanced if the public were educated to accept a compre hensive periodic examination that would reveal the early signs of any disease instead of some particular disease

The Great War emphasized the wisdom of thorough phy scal examinations as every country which entered the conflict arbitranily exacted a medical examination of its soldiers. In some countries the examinations may have been too hastily and loo superficially carried out because if the rapid development of the conflict. But the United States with its greater deliberation in cluded in its draft law a provision by which every soldier underwent a health examination con ducted not by one physician alone but by a group of specialists.

This no doubt was the most impressive demon stration and certainly the most extensive one on the value of a comprehensive health audit of a large group of apparently healthy men

The medical corps of the Army under General Gorgas alone accepted for service medically 4500 000 of these fit men and to secure this number it was nicessary to examine approximately ,000 000 young men. The difference in these figures represents those who were unfit.

These demon trations with examinations for special diseases gave great impetus to the propaganda in favor of all round periodic examina tions In 1919 and 1920 this organization the American College of Surgeons organized its se tional meetings since which time we have held sessions in practically every state of the United States and every province of Canada The prin cipal innovation is the carefully planned meetin for the lasts at which in imple language the lay man and woman are given information on the fun damentals of scientific medicine and especially the advantage of periodic health examinations The Gorgas Memorial Institute of Tropical and Preventive Medicine was organized in 19 1 As the activities of the Memorial have developed it has more and more urged upon the public the im portance of seeking an annual health audit by the

family physician In May 192 the Trustees of the American Medical Association urged the members of or ganized medicine through the county medical societies to encourage such examinations Blank were developed by the Association for that pur pose in Vav 1923 and in 19 5 the Association also prepared for the use of physicians a compre hensive manual v hich contains very useful hint on the method of conducting these examinations Dr William D Haggard in his Presidential Ad dress before the parent organization very elo quently advocated the periodic health examina tion and Dr Wendell Phillips made the sub ject an important theme of his Presidential Ad dre s

## XVI EDUCATED PILOTS

The public should know what we know-that in a large number of our states individuals are licensed to practice the healing art who are utterly ignorant even of the harest fundamentals of scien tific medicine cultists some of whom have not even a rudimentary knowledge of the basic sciences of anatomy physiology chemistry bacteriology pathology diagnosis ortheotherpri mary essentials of a medical education cultists some of whom utterly ignore or denounce the necessity of possessing any knowledge whatsoever of these indispensable requirements. The various cults under sundry names have graned the sym pathy of legislatures By subtle sophistry they have passed laws which require farcical examina tions in one or another pathy or cult authorized license to practice medicine or even surgery and have caused them to be recognized as legal practitioners of the healing art with all of the rights and privileges of the scientifically educated phy

Of the forty eight medical practice acts author ized by the individual states of the United States only five require that an individual to be licensed to practice the healing art shall show by examina tion that he has a knowledge of the basic sciences upon which obviously the practice of the healing art should be grounded. This means that in the other forty three states of the United States not requiring the basic science examination only the graduates in scientific medicine meet these qual ifications

The new hasic science law requires that every practitioner of the healing art shall pass success fully an examination in the basic sciences before he is eligible to present himself as a candidate to the state board of examiners for a license to prac tice medicine or the healing art in any form recog nized in the medical practice act of the respective The law drawn up by Dr William C Woodward Executive Secretary Bureau of Legal Medicine and Legislation American Medical Association is in my opinion the simplest basic science law that has been suggested and at the same time contains all essential protective re quirements The first section of the Enacting Clause reads

BASIC SCIENCE CEPTIFICATE REQUIRED No per on shall be eligible for examination or permitted to take an examina tion for a license to practice the healing art or any branch thereof or granted any such licen e unless he has pre sented to the licensing board or officer empowered to i sue such a licen e a certificate of ability in anatomy phys ol ogy chemistry bacteriology pythology diagno is and hygiene (hereinafter referred to as the basic sciences) 1 wed by the tate board of examine s in the ba ic ciences

VII A SOLUTION FOR THE PROMOTION OF SUC CESSFUL HEALTH EXAMINATIONS BY PERSONAL PHYSICIAN

In obtaining thorough health examinations how can we insure the independence of the family doctor the personal internist and the tavorite surgeon? How insist upon a thorough and com plete health audit save the public from the ex ploitation of unworthy groups stock companies or even the well organized clinics or well equipped dispensaries or hospitals and yet not lose to the personal physician his control of his own legiti mate clientele? On this point even the advocates of the health audit have been most apprehensive and their consternation has led them almost to the point of abandoning the program lest in spite of its advantages the independent practitioner he put out of business

The American College of Surgeons is success fully working out a remedy a supremely practical solution of the problem that will be satisfactory equalfy to the lasty the independent practitioner public health officials and the hospitals Obvi ously the difficulty lies in the fact that no one practitioner repardless of ability and eminence can individually overcome the prohibitive diffi culties and make a complete health audit unless he has at his command competent aids and intri cate scientific apparatus and laboratories

Where is the environment that will remedy this difficulty? Where do Barker Charles Mayo Christian or Cushing find satisfactory surround ings? The answer In well organized groups organized cfinics the standardized hospitals Which of these could without prohibitive confusion fur nish to the independent physician a place where he could personally make a comprehensive scien tific examination of his patient retain his inde pendence and not lose control of his own business? A httle consideration will answer this query in favor of the standards ed hospital

### VIII THE HEALTH INVENTORIUM

The Health Inventorium is planned by the College to meet this evigency. The suggested plan was submitted to one tenth of the 1 805 hospitals in the United States and Canada on the approved list of the College in 19 7 Almost without ex ception the plan was accepted. Thereupon the plan was submitted to all hospitals on our ap proved list in 1927 and finally there is a thor ough discussion of the subject at our hospital con ference during this session of the Clinical Con gress The fundamentals of the plan have met with almost unanimous approval

The plan briefly summarized is as follows

r Every standardized hospital shall furnish an examining room or rooms to which any legalized practitioner who is a member in good standing of his respective county medical soci ety and the American Medical Association may bring a patient for examination. There shall be no charge for the examining room.

2 The hospital shall furnish to the practitioner every facility in the way of adds consultants when necessary laborator tests etc.

patient s condition

3 The charge for the required laboratory tests shall be nominal and a maximum of actual cost

4 The I hiscian shall render to the patient a fill civering his fee for the examination and where there is a charge for laboratory services he shall be responsible to the hospital for its payment.

5 No hospital shall accord the e facilities to any individual who is not accompanied by his or her doctor or who does not carry a letter from his or her doctor in which certain services

are requested

6 An individual who applies for an examination and who has no physician should be referred to a duly appointed disinterested committee consisting of a representative or representatives of the county medical society and the standardized hospital of the community and this committee shall advise the patient in the selection of a physician.

7 Freept in dire emergency no hospital shall treat a patient who was examined in the

Health Inventorium except by request or con sultation with the referring physician

# THE DEMAND FOR HEALTH EXAMINATION AND ITS ACCEPTANCE

It is not surprising that life insurance companies should advocate and be ready to lead innancial support toward popularizing periodic health examinations. This commendation only emphasizes their importance. They recomize the movement as a substantial business asset as it will extend the life of their policy holders reduce the cost of insurance and incidentally substantially increase profits. Are not these facts substantiated by business agacity evidence that you and I as policy holders too will profit in lon-cr life and better health?

Dr Argustus S knight of the Metropolitan I ife Insurance Company recently at my request ga e me figures to indicate the increase of demand and acceptance by the policy holders of yearl examinations advocated and provided by escal

of the larger insurance companies
The I rudential Insurance Company of America
reports 1 500 examined in 1920 and 58000 in

19 7 or an increase of 3 867% in et ht years
The John Hancock Mutual Life Insurance
Company 146 in 1925 1 487 in 196 and 2 617
in 1927 or an increase of 1 792 5% in three years

The Penn Mutual Life Insurance Company re ports 568 in 1923 I 651 in 1927 or an increase of

90 50% in five years
The New England Mutual Life Insurance Company did not offer examination until 1925 In

	FABI F I —SUAMARY						
[		9	0 3	9 4	,	9.7	P t of 1 e
P d nt lI C mp f 1m	500					58 000	3867 (8314)
TI Jb II kMtlLf I					46	6 7	( 3) ⁵ )
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VwEgldMtlLfI a cCmp ;					В	4 600	
Eq t bl Lf A ce So ety	4 554					5 3	( 8 × )
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If E te I t tute	3 233					5 366	( 8 )
C n ll Cl		47				64	( 6) }

approximately 4 600 examinations were 1027 given

The Equitable I ife Assurance Society reports 4 554 in 19 o and 25 030 in 19 7 or an increase of

549 5% in eight years

The Metropolitan Life Insurance Company re ports 10 904 health examinations in 1920 and 92 361 in 19 7 or an increase of 847 0407 in eight vears

Life Extension Institute-13 233 examinations in 1920 105 366 in 19 7 796 2% increase in examinations in 8 years

Cornell Clinic-147 examinations in 192 645 in 1927 438 7% increase in 6 years

The approximate increase in demand for peri odic health examinations with companies which give figures for 19 0 and 1927 ranges from the encouraging figures of 549 5% to 3 867% (Table I)

Considering the short time occupied in the experiment this is a showing that demonstrates a substantial interest by the people Notwith standing a reluctance on the part of not a few policy holders to accept the service on the ground that it is not an entirely disinterested activity it is a movement that will develop incalculable health conservation

# VI INDEMNITY COMPANIES

Our College has been asked by a number of the important indemnity companies and industries who must provide protection to their employes to make a survey that will assist them to give the highest degree of protection to the employed in As a result through our Board on Fraumatic Surgery we made careful inquiry into the protective measures and health care that are provided to the great number of employes in large corporations Our close contact with the hos pitals of the United States and Canada makes this new survey dovetail very fittingly and economi cally with our yearly survey of the hospital field

# XXI INDUSTRIES

While indemnity companies and state laws furnish protection to men who labor in the in dustries in the last analysis such indemnity pro tection is financed by the industries themselves Wisdom and efficiency have led a considerable number of the larger corporations who employ labor to adopt methods of self protection by fur nishing to their men every facility that scientific medicine offers in the way of preventive and curative health measures and similar facilities are provided also to their entire administrative force The beneficent effect of this system in preserving health and furnishing the best surgical and medical aid in case of injury or illness is not of less im portance because it results in a financial saving to the industries which furnish the aid but it is the most substantial and effective commendation of scientific medicine and its relation to personal health

Our survey indicates that this form of humani tarian service has increased enormously since

Questionnaires sent 172

Replies received 61 (which represent approxi mately 844 053 employes)

 Medical service and periodic supervision 7 report complete and compulsory serv

5 report partial service

15 report service on employment only

I reports service after 45

reports service for factory employes only reports service for office employes only

6 report no medical service

3 report medical service optional

did not answer question

2 Attitude toward the service

31 report employes welcome it 6 report employes tolerate it

4 report prefer own physician 20 did not answer question

3 Medical service extended to families of em ploves

5 report yes

19 report occasionally

22 report no

15 did not answer question 4 Increase 1920 to 1928 in number of periodic health examinations

x reports 700%

1 reports 3∞%

I reports 100%

4 report 75 to 80% 2 report 50%

4 report great increase

7 report 10 to 40%

2 report no increase 30 did not answer question

5 I stimated percentage unsuspectingly har boring some disease or physical defect

5 report 90%

r reports 75%

4 report 50% 5 report 35 to 45%

4 report 15 to 5%

6 report 10% 4 report 4 to 8%

1 reports many 31 did not answer question 6 Age when degenerative diseases manifest

8 report ages 30-40

18 report ages 45-50 6 report ages 50-60

reports all ages

1 reports depends on individual

7 did not answer question , I robable result in preventing modifying post; oning or curing degenerative diseases

6 report much benefit

ro report some benefit

reports one half ignore advice question the value

1 did not answer question
S. I robable effect in increasing longevity

8 report great benefit

o report increase life from 4 to 10 years report increase life from 10 to 20 years 4 report some help

as did not occur on conception

21 did not answer question
The above summary represents 61 replies from
industries which employ 844 053 individual

#### NATI LABOR

Labor ha not been slow to recognize the im portance of this movement Samuel Compers outstanding statesman of labor during his life time earnestly and continuously urged his great army of followers to ally themselves with scientific medicine His worthy successor William Green the present President of the American Federation of Labor 15 backing the pro ram of our College to improve the status of industrial surgery and medicine There is no power greater than organized labor to influence the advancement and extension of scientific medicine Following the demonstration of the care of men in industry especially in the production of munitions and other materials for warfare the average increase in verily health audits among labor men based on our survey is approximately 95% since 1920 This favorable showing is possible because most of the industries surveyed had similar service in 1020

#### XXIII ARMA AND NASA

As early as 100. Theodore Roosevelt with his alert mind looked with appreciative vision upon this problem of keeping physically fit and char acteristically he acted. Why have weak links in the United States Army, Navy Marine Corps and Public Health Service when by proper medical supervision the unfit units could be weeded out? From that time to the present the United States soldiers sailors and marines have been submitted to resulter physical examinations. The

benefits of that program are now extended to the members of their families. By this regulation alone over one million citizens are examined yearly and receive the benefits of preventive medicare

# VAIV UNITED STATES ARMS NAVY AND GOVERNMENTAL DEPARTMENTS

Questionnaires sent 10 Replies recei ed 0 1 Aremedicalservice and supervision provided

2 report compulsory service

6 report service (entrance only)

reports no service

2 Total number represented 5 replies represent 609 786 individuals 4 did not answer question

Attitude toward the service and supervision

6 did not answer question
4 Is service extended to families

1 reports occasionally 8 did not answer question 5 Increa e 1920 to 1928 in number of periodic

liealth examinations
2 report compulsors prior to 1920 and

7 did not answer question

6 Estimated percentage unsuspectin ly har boring some disease or physical defect

reports 6% 8 report no data

7 At what age do degenerative diseases manifest themselves

1 reports ages 38 to 40

2 report age 45

6 did not answer question

8 Probable result in preventing modifyin
postponing or curing degenerative di ea es

2 report prolon, life

reports reduce morbidity and mortality

6 did not answer question
 9 Probable effect of periodic health examinations in increasing longevity

reports 1000 increase

reports 25% increase report increase

4 did not answer question

XXV ELEMENTARY AND SECONDARY SCHOOLS

In the last ten years in my travels and talks at sectional meetings of the American College of Surgeons I ha e found well organized educational departments in practically every state of the United States and every Province of Canada With few exceptions primary schools and author thes in higher education are careful to note the physical well being of pupils It is an exception

if the authorities do not insist upon vaccination against smallpox examination of the throat ton sils hearing and eyesight. As an authoritative statement on this subject I herewith submit an analysis of our survey which summarizes the ac tivities of the health authorities of eight cities of the United States with a population of not less than 50 000 each

Questionnaires sent 13 Replies received 8

 Are medical service and supervision provided to students

5 report compulsors with all students

reports optional with all students

I reports compulsory (entrance only) with all students 1 reports optional (entrance only) with

all students

2 Total number of students 2 308 349 3 Attitude toward medical service and super vision

7 report welcome it

i /3 report welcome (1/3 refuse mainly Christian Scientists chiroproctors etc.)

4 Increase 1920 to 1928 in number of periodic health examinations

41% average increase

3 did not answer question

5 Estimated percentage unsuspectingly har boring some disease or physical defect

50% average

I did not answer question

XXVI INSTITUTIONS OF HIGHER LEARNING

Questionnaires sent 13 Replies received 4

 Aremedical service and supervision provided to students

4 report yes

2 Total number of students 51 370 3 Attitude toward medical service and super

vision. 4 report welcome it

Increase 19 0 to 19 8 in number of peri

odic health examinations

225% average increase 2 did not answer question

5 Estimated percent ige unsuspectingly har horing some disease or physical defect.

reports 50% 1 reports many

did not answer question

6 I robable effect in increasing longevity

I reports increase life to years 2 report great benefit

I reports increase life to to 15 years

## VII EMPLOYES OF CITY AND STATE HEALTH DEPARTMENTS

Questionnaires sent 26

Replies received 16 Are medical service and supervision provided

to employes? g report no medical service

7 report yes

2 Total number of employes approximately 5 000

3 Attitude toward the service and supervision

6 report employes welcome it

2 report employes tolerate it 1 reports employes prefer own physician

7 did not answer question

Is service extended to families

o report never

, report only when requested 4 did not answer question

Increase 1920 to 1928 in number of peri odic health examinations

reports 37% 2 report 100%

1 reports 500%

12 did not answer question

6 Estimated percentage unsuspectingly har boring some disease or physical defect

1 reports 3% I reports 10%

1 reports almost all 13 did not answer question

7 At what age do degenerative diseases mani fest themselves

r reports ages 35 40

4 report ages 40 45 1 reports age 50

1 reports ages 40-60 r reports ages 55-60

8 did not answer question

Probable result in preventing modifying postponing or curing decenerative diseases I reports questioned the value

8 report beneficial

report postpone

1 reports 60% improvement

4 did not answer question

I robable effect of periodic health examin;

tions in increasing longevity 12 report great benefit

4 did not answer question

## XXVIII I STIMATED INCREASE OF DEMAND FOR EXAMINATION

A questionnaire was sent to several groups of leaders in the profession and the replies were most impressive

371 questionnaires to Fellows of the American College of Physicians (born 1881-1890) 276 questionnures to Fellows of the American

College of Physicians (born 1875-1880) 180 questionnuires to Active Members of the

Association of American Physicians questionnaires to Emeritus Members of the

Association of American Physicians s questionnaires to Associate Members of the Asso ration of American Physicians

to questionnaires to General Practitioners (se lected at random) in towns of 10 000 or

Question No. 1 In your own practice what is the percentage of increa e thetween years 10 o 19 8) in the number of periodic health examina tions of apparently healthy indi iduals were 254 replies the largest propertion from the younger group of physicians A dehmte per centage of increase in number of examinations as reported by 180

54 report from a slight to 15

increase 43 report from 1507 to 40 merease

q report from 50 to 90° increase

19 report 100 ¿ increase 25 report from 00 to 500 c increase

5 report from 800° to 1000° increase reports 2875 increase

is report very much greater percenta e

38 did not reply specifically

8 report n t in practice 19 report no increase Ouestion No Among apparently healthy individuals thus examined what percentage were unsuspectingly harboring ome form of di ease or physical defect?

61 did not answer question reports questionable

g report none

to report few

88 report from 1 to 20

5 report from 50° to 70°

24 report from 75° to 95° 7 report 1000 1 reports large number

Thus to summarize these two tables we dis cover that there is a growing interest in periodic health audits on the part of apparently healthy

laymen women and children The questionnaire also exhibits our profession s wholesome interest in this subject. With better facibites furnished to the general practitioner through our Health Inventorium and the in creased demand for periodic health examinations on the part of the public this preventive measure for conserving health and life will make notable progress in the next few years

Briefly we note by the questionnaire Ones tion I that there has been an increase between the years 1020 to 1028 on a conservative estimate of reports of approximately 1% to 1 000" in examinations of apparently healthy individuals By Ouestion 2 that of the individuals examined who were apparently well from 1% to 100% were harboring unsuspected disease

### CURABILITY OF THE DEGENERATIVE Diervers

The diseases of middle life and advancing age already referred to are now attracting the atten tion of scientific medicine What are they? At what age do they manifest themselves? Can they be postponed by thorough periodic audits? If they exist can they be influenced by curative measures? And can the average limit of old age be advanced by careful surveillance and scien tific management?

These questions are important not only to the scientific practitioner of preventive and curative medicine but to every person whether of early middle or advancing life 330% of whom at the present time succumb unnecessarily early and in the interval between birth and death suffer needless alls that destroy the pleasure of whole some and healthful existence. In the second part of our questionnaire to this same group of practitioners this subject was dealt with most inter estingly by 228 doctors who honored us with

replies Question to 1 In your experience at what are do the degenerative diseases of old age mani

fest themselves? 30 replies were recorded

reports late teens

I reports ages 15 to 45

2 report 30+ 93 report 35 to 45

84 report 45 to 50

34 report 50 to 60

8 report 60 to 65

r reports 75 r reports questionable

3 report not matter of years r reports distinction between male and

female ages 40 and 50 respectively I reports distinction between whites and

negroes ages 46 and 40 respectively The range of years for the development of degen erative disea es from 15 to 75 with a large

preponderance from 35 to 50 years Question No 2 What would be the probable

result in preventing modifying postponing or curing degenerative diseases of advancing age if

each individual would have a yearly or more fre quent examination and supervision?

216 replies were recorded

73 report much good accomplished 66 report modify and postpone (of these 30 in cluded cure and 40 prevent )

35 report prolong life increase efficiency

6 report no benefit

15 report fair

13 report very little good 8 report questionable

These r6 replies from the same group most of them the leading picked physicians of the United States indicate a very great interest in degenerative diseases and a behef that their course could be modified and postponed through these examinations

Question No 3 Probable effect in increasing

longevity

32 replies were recorded

70 report increase life to to 20 years

4 report excellent

reports excellent after one generation

70 report marked increase

57 report some increase

a report question the effect

I reports no increase

2 report inheritance important factor Question No 4 Do you advise your patients

to submit themselves to periodic health examina

241 replies were recorded

20 report yes

13 report occasionally

8 report no

# SUMMARY OF REPLIES FROM TWEELST. ORGANIZED CLINICS

Questionnaires sent 23

Lephes received 12

1 Percentage of increase in periodic health examinations 1920-1928

I reports 500%

1 reports material

3 report 100%

3 report 25%

2 report 10%

r reports none

1 did not answer question Estimated percentage harboring some dis-

ease or physical defect 1 reports astonishingly high

r reports 100%

r reports 85% 3 report 50%

2 report 20%

t reports 10% 2 report 5%

i did not answer question

Approximate age when degenerative diseases manifest themselves

From 35-60 mostly 45

4 I robable result in preventing modifying postponing or curing degenerative diseases

s report prolong life

3 report prevent modify postpone

report fair

did not answer question

5 Probable effect in increasing life to report prolong life from 4 to 10 vers

1 reports prolong life many years

i did not answer question

6 Does your clinic advi e periodic health ex

aminations

9 report yes

r reports occasionally

I reports no

t did not answer question

FINAL SUMMARY OF OUR INTERPRETATION OF THE FIGURES OF THIS INCONCLUSIVE SURVEY AND RESEARCH

(a) Estimated number of periodic health exam mations of apparently healthy individuals-in 1920 5 000 000 1n 1927 25 000 000 (b) One third of the deaths in 19 5 (or 502 083 deaths) are attributable to degenerative diseases of middle life and old age (c) Degenerative diseases mani fest themselves at average age of 45 years (d) 236 replies from eminent internists and 18 replies from general practitioners indicate yearly exam mations would modify and postpone the de generative diseases and increase longevity and the maximum old age limit (e) 35% of apparently well individuals receiving periodic health examinations are found to harbor some form of unsuspected disease or physical defect (f) 90% of our replies from internists and out standing clinics reveal that patients are advised to submit to periodic health examinations (g) Labor in industry employes in governmental and civic organizations pupils in elementary and secondary schools colleges and universities practically all receive and welcome some form of personal periodic supervision advice and serv ice and at least 17 500 000 receive complete periodic examination service and an estimated additional 3 000 000 men and women not in cluded in the above brings the grand total to 20 500 000

The above figures while not conclusive in dicate the enormous interest that is developing n the subject of periodic health examinations. However this is not a guarantee that all of these examinations now are to the highest degree comprehensive and efficient. The figures do indicate the lay public s receptivity to this important in novation. And their acceptivite of the ministrations of scientific medicine places upon the profession a responsibility that should induce us to give a one hun fred per cent service.

#### XXX CURVILLI MEDICINE AND SURGERS

Each Jay dective surgers alone—with early operations for cancer gotter prostatic degeneration appendicties spinal cerebral bilary gratter and infectious diseases—is extending the lower limit of longe its vand restoring invalids to healthful hung.

Given opp rtunity to examine individuals be tore disease is suspected curative medicine with its aids in diagnostic precision and its therapeutic accuracy is keeping people well curing the sick and daily adding to the wholes mene sof ling and the span of life

#### VAXI THE INFLUENCE OF THE PHY KINN IN GAINING CO OPERATION OF THE I UBLIC

A mistaken [click of silence and a tradition if normalizability in discussing the health problems of our patients ha militared against our full inducence with the public. No profession not even the ministry, can more effectually guide a large proportion of the community on a private or public policy. When we faul to evert this prestige it is the fault of our profession and not of the public.

We have had three outstanding illustrations of this statement

In 1920 the irregular practitioners of the healing art the patent medicine venders in California backed to sul sidized newspapers attempted to preven animal everymmentation in the terching of medicine within the state. The scientific medical profession was aroused the educated and sane people of that great state ril led to their support and the untagon is of scientific pro-cress were completely routed.

2 In 1922 a similar beligerent campaign against scientific medicine occurred in Colorado for a time it appeared that the qualified doctors would have to forfeit those requisites which are midispensable to the teachine of their profession and that the legislators of an important state were to turn thumbs down on the progress of civilization. Again the scientific medical profession was aroused everted its influence took the public into its confidence told them the facts

obtained their co-operation changed the tid toward sanity and common sense and completely routed the opposition

3 In 19 't Massachusetts indifferent to the growth in its midst of the most subtle forms of irregular practices found these same cults who repudated the conventions of civilization and considered themselves strong enough to terminate the teaching of scientific medicine were organized to stop animal experimentation in the teaching of medicine was aroused—they gain I the co-operation of their patients and together they routed the Ninghts of Uninghteous ness I evond redeemption.

The profession of medicine everts a powerful influence and can if it will convince at least 15% of our people that it is their inalienable right to be kept well and that the scientific medical profession is the one authentic accredited and competent agency equipped to keep them well so far

1 humanly possible

Lay people in the majority are waiting for us to take the lead in the practice of the healing art to halt our mysterious method and in them face to face facts and guidance so that they may be maintained in good health.

#### XXXII GENERAL SUMMARY

- r The profession of scientific medicine or gamized before the advent of Christianity is the eldest of learned professions. Spiritually morally and scientifically in all civilized countries it is outstandingly the recognized authority in the prevention and cure of disease. Like the great religions of the world it r co nues no geo raphical or political bounds but unlike the great religions sentific medicine has no competitors. It is the one authority reconized by all civilizations.
- 2 For centuries scientific medicine was pricticed as an art and every scientific truth employed to make its authority more worth, and reliable With the development of the exact sciences it has strengthened its art and made more definite its authority, and accomplishment by appropriating the proved truths of modern science until it is now known and properly so as the science of medicine.
- 3 Is we have shown problems of disease one after another have been and are bern conquered and not only the trained physician has thi knowledge but the educated layman too is prepared to accept pre-entire and curative scientiff medicine as the recognized authority and rapidly the public is improving the opportunity.

1 000 752

2 000 000

to keep ht and submit to periodic surveillance by the practitioner of scientific medicine

4 The thorough physical examination of mil lions of soldiers in the Great War proved the value of scientific medicine and convinced millions of men of the wisdom of a periodic physical audit under the supervision of scientific medicine to keep themselves well Through systematic propa ganda advocating preventive medicine to con serve personal health the general public has be come aware of the value of periodic health exami nations, labor has been convinced of the value of seeping well and the industries as an economic asset have been induced to establish scientific facilities to keep their employes to the highest degree in good health

5 Change of opinion has been wrought in the minds of the laity in their attitude toward the relative wisdom of periodic audits to preserve health rather than to wait for illness to make evident a possibly incurable condition. A whole some evolution in the practice of medicine is re sulting and it promises to become a boon that will preserve personal health to the maximum and afford satisfaction to the scientific practi tioner of medicine because of ability to practice his profession with greater precision and success

6 The American College of Surgeons has oc cupied an important position in this movement which must command the support of the teachers of medicine the practitioners of medicine the authoritative societies of medicine the journals of medicine and through all dignified means of publicity it must educate the public to the neces sity of co operation with scientific medicine if they are to be protected from illness and if the happiness of their lives is to be enhanced

7 Statistics show that 25 rr2 300 individuals in the United States are employed in industrial occupations According to our limited survey one half of these individuals receive medical service and periodic supervision conservatively we estimate that of the total employed only one fourth receive this service or 6 278 077

In the U S Army Navy and Marine Corps 50 188 of their personnel receive this thorough service which is extended also to the members of their families On the basis of four members in each family this brings the estimate to 1 000 75

There are in the elementary and secondary schools universities colleges and professional schools (continental United States) 27 381 816 pupils and instructors. Our survey shows that three fourths of these receive medical service and periodic supervision but conservatively we esti mate only three eighths or 10 268 181

#### SUMMARY

Individuals in industrial occupations who receive complete incdical service.

and periodic supervision (estimated) 6 78 077 1 S Army Navy and Marine Corps and members of their families (esti mated)

I upils and instructors in elementary and secondary schools universities colleges and professional schools of continental United States (esti

matedl to 268 t8t I urther it is estimated that an addi

tional 2 000 000 men and women not included in the above receive com plete and thorough periodic health examinations

Total in these four classifications who receive medical service and periodic supervision (estimated) 0 54, 010

8 Through our recent research and study with the industries labor insurance indemnity com panies governmental state county and civic authorities our universities colleges high schools and primary schools and others in their preventive health activities from our direct questionnaire to our most influential practitioners of medicine there is convincing evidence that the public is rapidly accepting the policy of co operation with scientific medicine and the practitioner of medicine is more and more willing to do his part all of which offers conclusive proof that within the next ten years the momentum of this evolution will find 20 000 000 of our people accepting the program of yearly health audits to conserve personal health as readily as they now accept the protection provided to the masses by public health activities

o The health inventorium-which brings into the strong trinity of co operation the scientific medical practitioner the standardized hospitals and the lasty-when thoroughly understood and accepted will insure to every practitioner ade quate facilities to make thorough examinations and to the public a thoroughly reliable service

10 The questionnaire to internists and general practitioners reveals a keen interest in observa tion and study of the insidious diseases of middle and advancing age-the degenerative diseases and most of them have expressed the definite opinion that yearly or semi yearly health exami nations will reveal these diseases in their incibi ency afford opportunity to modify and postpone the propress of many of them and definitely pre vent the development of some of them Inasmuch as one half of our yearly deaths are attributable to diseases which reap their harvest in man's years of greatest usefulness the significance of the authoritative information is apparent

- This review of the evolution of the progress of clinical medicine and surgery emphasizes our responsibility as praetitioners of medicine We must give service to the utmost of our ability and with the lay public must rest the responsi bility of accepting it. Volunteer acceptance of the program will
- (a) Preserve rather than restore the health of 100 of the people to the greatest degree pos sible through the sciences
- (b) I coure that practitioner of medicine be edu cated in the basic sciences before they may be licensed to practice the healing art
- (c) Make realily available to medical schools all ficilities necessary to teach scientific medicine and to preserve modern research methods in the laboratorics by animal experimentation
- (d) Lmploy all dignined publicity methods guided by scientific medicine to enable the public to recognize the reliability of scientific medicine and to distinguish it from the subtleties of uneducated pretenders and imposters
- 12 Alas this review estimates that approximate ly one fourth if the lasty are now indifferent to the benefits of scientific medicine and that approx imately another one fourth are antagonistic to it the victims of sci hists juncks and other unscien tifie practitioners. While this affects detrimen tally the individuals of adult life whose wi dom should guide them to choose judiciously and with whom it is futile to protest unfortunately it also affects their innocent children and dependents and results in much unnecessary siekness and many premature deaths. The mereased health rate and the number of lives saved in 25 years of this century by the application of scientific medicine pro es that the refusal of this large propor

tion of our people to accept our aid without doubt accounts for much unnecessary illness and sufferin and at least 17 581 2 preventable deaths each year

- 13 More than to o thirds of our people morally and spiritually favor the 18th Amendment to the Constitution of the United States In spite of the injudicious administration of this 18th Amendment which has resulted in an organic law breaking of self indul ence and ridicule on the part of the other one third of our citizens the foundation has been laid for a demonstration of race betterment and extension of life that will astonish the world
- 14 It is my wish that this review may aid to convince the people that one half day each year should be set aside for a comprehensive health audit of each member of every family. As physi cians we know the essentials and the detail of scientific medicine. We belie e that the layman and woman from childhood should have a con incing knowledge of the essential of preventive medicine This knowledge must be imparted by

di_nified publicity methods by teachers who are educated physicians

Speculation though not conclusive i interesting If this reasonable pro ram is ac cepted and acted upon (and the present attitude of the people indicates that it is being accepted and adopted) based on our comprehensive sur vey I venture to predict that accurate stati tics will record an extension of longevity from an average of 58 years in 1920 to 65 years in 1930 extension of middle age (40 to 70 years in 19 0) to from 45 to 80 years in 1930 and a postpone ment of senility and extension of the average old age limit from its present average of 90 years to 100 years or more in 1940 And what is of greatest importance periodic health examinations with the resulting decrease in preventable ill ness will add immeasurably to the wholesome ness and happiness of more than 100 millions of people in the United States and Canada

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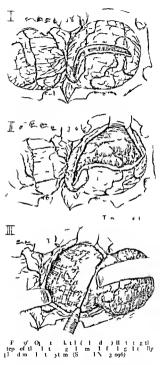
Speculation thou h not conclusive is If this reasonable program is ac interesting cepted and acted upon (and the present attitude of the people indicates that it is bein accepted and adopted) based on our comprehensive sur vey I venture to predict that accurate statistics will record an extension of longevity from an average of 58 years in 1920 to 65 years in 1930 extension of middle age (40 to 70 years in 1920) to from 45 to 80 years in 1930 and a postpone ment of sensity and extension of the avera e old age limit from its present average of 90 years to 100 years or more in 1940 And what i of greatest importance periodic health examination with the resulting decrease in preventable ill ness will add immersurably to the wholesome ness and happiness of more than too million of people in the United States and Canada

# LUNENS PICTORIAL IECHNIOUE

(YNECOLOGICAL SIRIES

# Sutures with a Reputation





Flect Sugery s a ad to the oval f Intracramal I nors—II y Crshing

# SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE PUBLISHED WG In'I

*VOLUME VLVII* 

DICEMBER 1978

/CHILL !

# FLECTRO SURGERY AS AN AID TO THE PHONE OF INTRACRANIAL TUMORS

BY HARALL CIPHING AD LICE IN.

With A Preliminary Note on a National Correct Generator by \$1 ft (5 4

NEW ELECTRO SURGICAL UNIT W T BOATE) THE apparatus here de cribed ha been developed with the idea of making instantly available to the urgeon the various kinds of currents which have proven most useful for his purpose delivering them through a single lead into operating in tru ments of practical design No u e 1 mide of electrically heated cauteries wires or calpels The effects obtained depend entirely either upon the heat developed by the current in passing from the active electrode into the tissues or upon the ohmic heat developed by the current in passing through the tissues

As is well known comparatively large amounts of an alternating current if the fre quency of the alternations is sufficiently high can be passed through the tis ues without producing any physiological effect other than that of heating The amount of heat developed by a high frequency current is proportional to the square of the current density

In electro surgery a high current density is obtained by making the active ( operat ing ) electrode small whereas the mactive ( indifferent ) electrode through which the electrical circuit between the patient and machine is completed is made large so that the current density in its immediate vicinity will be sufficiently low to permit the mall amount of heat developed to be readily dis sipated by the blood stream

For certain purps 615 as in the one and tract the partible guration to dispute, i mad the electrode entantia production care cut being made be received the machine Under the tracking of the tracking of the minutes of the manufacture of the machine Under the terminal or body bar to the the machine patients body box 'c mtarce the charged with each in the left ( the carrier of d electrode into an R ted the heient to produce & - t -

This preliminan place for a discus. the various current principles involved currents used cha from one to three distribute themsel in a manner very d currents or alter. frequency such a ing circuit Thu p voltage and amp. currents and for frequency are the terms phase shall served if instead the physical cha ne citalogue of the effects at

١t. th the tor Ating ustion ncy in

current crode may g point for l was merely tatic agent nto trouble

> aner maker r 3 10 ( welling on ously of pr

Bush m B M mo al Hosp Fmth Il phy 11abo 13 f h II

tissues

There are three distinct ways in which the virious high frequency currents delivered by the Unit are used in electro surgery (1) super till dehydration (2) culting (3) tissue corquition

I for superhetal dehydration the active electrode is held not in actual contract with but sufficiently cloe to the tribuses to be dehydrated so that sparks are sprayed across the intervening space. The very high temperature of the sparks is sufficient completely to dehydrate a thin outer layer of tissue.

For cutting purposes the active electrode is energized by a different type of current The cutting is not done by the electrode which has no harpened edge but actually by the current which forms ahead of the electrode an electrical arc which by volatalizing the trisues senarates them as though they were Further by a suitable modification (variable amount of damping) of the same current a greater or a lesser degree of congula tion or dehydration may be produced at will it the edges of the severed tissues. When the tissues are not particularly va cular the cur rent is so modified as to produ e the minimum amount of debadration, but when the blood supply is greater the amount of dehydration is correspondingly increased

The apparatus is provided with control witches so that the active electrode can be instantly energized with the particular kind of cutting current which the surgeon requires for sometimes he wishes a strong current to make deep inclusions rapidly at others weaker currents by which deheate bloodless dis

sections may be carried out

3 For heating the Issues en masse (the so called electro coagulation) the kind of current used differs widely from that employed for cutting. An electrode energized with coagulating currents instead of having cutting properties cannot be moved through the tissues. The tis use surrounding the electrode become heated to a depth depending on two factors the density of the current and the length of time it is permitted to flow. If a large tissue mass is to be coagulated a comparatively weak current must be used for a prolonged period until it becomes heated throughout for should a stronger current be used the

tissues in the immediate vicinity of the acticlectrode would become so quickly dehydrate or even carbonized that the current woul cease to flow and the diciper tissues would not be effected. If on the other hand a small tissue mass is to be congulated one uses a strong current for a brief length of time so that surrounding tissues are not affected.

It has been sufficiently emphasized in the foregoing paragraphs that the usefulness of this electro surgical unit lie in the possibility it offers of varying at will the character of the cutting current so as to secure different

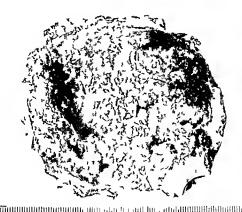
degrees of dehydration

The appuralus. The usual electro surgical apparatus is provided with a foot control for turning on and off the current. But ince it has been found in practice that a foot control limits the surgicon too much to one position a convenient hand control has been added. This not only gives the surgicon increased freedom of movement but greatly facilitates by co-ordination.

Because of its shape the hand control has become known about the laborators and hos It consist of a pital is the pistol grip special liandle de igned to hold the operatin electrode the current being under the control of the surgeon's index finger which pre ses a small trigger A number of operating electrodes have been constructed for special purpo es all of them interchangeable in the pi tol grip For obvious reasons such acce and so on which the ories as retractor surgeon needs to employ in the operating held should be constructed out of in ulatin materials

# NEUROSURGICAL FAPELIENCES WITH THE BOATE UNIT (HARVEL CUSHING)

The surgery of intracranul tumors has grown from its small and unsatisfactors beginnings to a specialty of unquestioned importance. Tumors of the brain of one sort or another are extremely common and as expenience accumulates they are coming to be treated with increasingly favorable results. Such notable progress indeed has been made in recent years that the dismal attitude regarding these operations widely held at the turn of the century has gradually been



 $\Gamma_1$  . Cale in Thermal surface of remaining block of tumor with en irclin bone removed with subjacent durant the third session



3.4 Ca e : The patient on d large et hte n d ys after operation I١

monia. The lesion slowly enlarged until 1 reached large s z (Fig ) It s pai less had an in r as d surfac temperature and vas oft almo t fl ctuant in consist nev. The \ as sho ed that th bo und rlying the tum r as highly as ul ri I and d fective Various diagno is were mal suhaa v t bron co teomy I t cabs ess a ho!ttm meningioma syphilom and a m I noma but a apidly groving sar oma was d Th the ala dn urolog cal examinate n r rt fr m th 1 1bl tumor s n e ti timi v le i vas detect d in lungs prostate or

On Spt le 5 th t ns 11h m lif fit I fom ov the su face of th tmr \ ttmpttrm the xtra anal p r f th g th ly scraping it a fr m the l nihghi va ula zed bonc!!t II ling which fills g t un kr tr l l th mplantatin of mu l and of tt n 1 l lg t 1 in / krs flu d Though the din la am pr an s from 1 ss of blo I nugh fith gro the as finally moved to pmitth rikt! lpt b rpl land cls l Ih pulati ns f th I ran w c transmitted to the lac f th tum r in the pathological bon df t nd t a th oper tor impr s n that he a dal gith am lg ant typ of m ningioma D B i m t urr scu an! tha damp d lh lat g u nt th r muning trrall t of the gr th srm 1 th loop cle to! n!th 11 1



I C RPII g tm fkI

ing point checked by coagulation. The large f the skull inval d by the tumor v as the eneural la asking of perfortations which ere connected by Montenov si forceps. Blee ling vas pofuse and a transfusion was need so, The flap was agait close let but draining.

On Octob ril at a first stage op ration the scale are again rest et 3 and the entire block of in obtained bon together with the adhrent du a measuring about to be 8 centim 1 rs 1 circums rice was removed (1g 2) bb ling from the dural migras being assily entrolled by the application of dip and by coagulatin

The pill I gield Irignosis vas a my loma of plasma cell type. Subsequent X ay study of the entire skel ton fail I to real other feet of deas

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It may have been an error in judgment to have undertaken the operation but the dia nosis wa uncertain and with the procedure once started there wa no backing out The operation could in all probability have been completed in a single sitting had we known as much then as we do today of electro surgical method of attacking a lesion of this type but as thin, stood two year and we were fortunate enough to get safely through the critical second session without a fatality During the cour e of this second operation the raw central surface of the tumor had been thoroughly coagulated and it was a matter of great sati faction to find at the final es ion ten days later that there had been no un u uni reaction from the large area of super ficially charred tissue that had been so lonhursed

Shorth after this another patient a twelve year old child with \( \tau \) midline extracranial tumor of simility ort (Fig. 3) entered the clinic. The pre operative diagnosis in the car discount into the extracranial lesson in spite of its vascularity was without difficults clenthy removed in a single esson and what might otherwise have been a serious operation proved to be a simple matter. Healing was reactionless (Fig. 6). The growth unfortunited was a medistatic sympathicoblistoma and the child had began to show evidence of a spinil metasta is by the time of her hospital discharge.

During this two years period we have with growing confidence come to utilize electro surgical methods for increasingly difficult surgical problems and have even sent for old patients who have either been refused operation in the past or whose tumors on exposure have been regarded as inoperable In all of this we have undoubtedly increased our oper ative mortality for the sense of security due to the vast improve ment in the technique of hemos which electro surgery makes possible has led us into undertakings that would have been foolhardy to say the least in other days

By no means does the introduction of this adjunct to cramo cerebral surgery mean the

entire abandonment of the established prin ciples of osteoplastic intracranial procedures It is chiefly revolutionary in that it enables the surgeon to excavate the central portion of many tumors particularly those that are encapsulated with greatly lessened bleeding so that the growth may be collapsed and its shell more safely and with less contusion than formerly be brushed away from the envelop ing brain This is no new principle to be sure for it has been long applied in the intra capsular attack on the tumors of the cerebel lopontile angle that arise from the Aerous acusticus But it has been far less commonly utilized for the removal of other tumors it having been the surreon's ideal to remove the growth when possible intact rather than in separate fragments owing to the risk of moculation of the field by tumor cells which the piccemeal method favors. But when the electrical loop is used for the purpose the risk of sowing viable cells is negligible

These principles of primary intracapsular enucleation by electrical methods apply more obviously to the treatment of the meningeral tumors which were among the first to be successfully though in the beginning some what crudely attracked. They consequently deserve primary consideration and the case



Figs 5 6 Sympath to blastoma before and after its electro urgical removal. Pre operative diagno is mening oma arcoma or myeloma.

reports may well be restricted to our experiences in the spring of 1927 as they are more likely to illustrate technical errors and accidents that have since come to be largely avoided ¹

The Meningiomas From the standpoint of their relative benignity these of all intra cranial tumors are regarded as the most favor able for operation. However, they often attain a huge size before they are recognized their environment is apt to be excessively vascu lar their attachment to one or another of the large dural sinuses supplies an element of especial danger and if the area of attach ment is not removed a recurrence is inevitable they often arise in inaccessible regions of the base of the brain and even when more favorably situated their removal intact is likely to be followed by cerebral cedema and by circulatory disturbances on the part of the cerebrospinal fluid that delay convales cence Hence they are possibly in the long run the most difficult of all tumors safely to attack and completely to remove without sec ondary complications

Then discribed to the discrimination of the thing of the tendent of the discrimination of the tendent of the te

Encouraged by the technical success of these operations we began step by step with Dr Bovie's moral support to engage in the more serious business of attacking tumors that lay wholly within the cranial chamber We were of course dealing with a novel proce dure and were utterly ignorant of the im mediate physiological or remote pathological effects that might be produced by electrical dehydration or charring of the nervous tissue 1 Many shifts and adjustments from our customary methods of procedure were found to be necessary but we fortunately avoided any serious accidents other than an occasional infection which crept in to mar our generally arreproachable wound healing These few infections were due as we have ince learned to faulty technique rather than to any lowering of the resistance of the tissues to which we at first were inclined to ascribe them

The whole question of the anasthetic had to be carefully reviewed for though most intracranial operations today are carned through under local anasthe ia a supple mentary inhalation narcosis may sometimes be necessary if the patient is mentally unco operative or made physically uncomfortable On certain occasions in the course of prolonged operations the body became so heavily charged that the anresthetist on ac cidentally touching the patient's face could get a spark which might well enough have caused an ether explosion under the hood Only once however did anything of this sort occur It was a case in which a small opening had been made into the frontal sinus in the course of a transfrontal o teoplastic operation This led to a direct communication between

the respiratory passages and the field operation and suddenly the ether vapor sparked and went off in a blue flame for nitely without any injurious effects. The reprenence however was sufficiently deconcerting to lead us for a time to substore inhalation narcosis the rectal administration of ether to tide patients when neces over the more uncomfortable period of a longed session.

Other difficulties experienced at the out were due to the fact that epileptiform attack were occasionally produced (cf. Case 6) when the electrode was used to check bled ing from the surface of the dura. For thou 1 these high alternating currents are not supposed to have any stimulating effects irrichle tissues apparently under certain circumstances they could become so diffused from the point of discharge that their over tones were capable of producing physic logical responses and a Jacksonian fit or a consulsion in the course of an operation when the dura is open may lead to senous consequences.

We were also troubled at the beenning, by the tendency of the current to become grounded through the table throu h the metal retractors and so on Once the operator received a shock which passed throu h a metal retractor to his arm and out by the ware from his headlight which was unpled and to say the least On another occasion (Cast

to say the least On another occasion (Case 4) owing to the improper application of the indifferent electrode during a prolon, ed opera tion a second degree electrical burn was produced which was slow to heal Some of these complications were due to inexperience some of them lay at the door of the apparatu itself and we were temporarily forced to employ a wooden table wooden patulæ and so on but one by one the difficulties have been wholly eliminated by progressive modifica tions in the design of the current generator Further improvements will unquestionably follow but as things now stand those who come to use the apparatus will be pared from much that we have gone through and will find it possible without risk to utilize their ordinary operating table equipment and cus

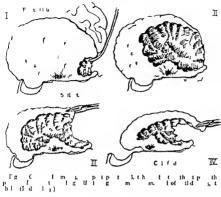
tomary methods of procedure



It is 9-10 Ca e (Left) Photograph of the patient on her di charge showing the inconspicuou car and the li hi re-idual palss of the m lit third nerve which had been contu ed during di lod ment. I the po tenor fragments of the growth (Right) I hotograph a ear later to show coo ery of the third nerve pal 3 and in 1 tible car.



Fig. 11 Case. Photo, raph of such fagments of the tumor as were preserved. The large partly excavited block of the growth bown on the right lay holly to the left of the fath and is van that fright fath and the fa



I ortunately however the most scrious of all po toperative complications namely a wound infection with conditive meningitis has long been wholly eliminated and consequently when a latality from an infection till back the prolonged to e of the current in our first eriou case we were greatly dishartened even though there were extenut the current in been un uspected was an extremely large and

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fibrous one which aros from the an le of fals and tentorium the or eration was long drawn out there were strang ers unfamiliar with the fastidious ritual of the operating room who were running the appa ratus that had been bor rowed in the emergency and there may nos ably have been some slip in the proper sterilization of the pistol and elec trodes that came to be handled by the operat ing term At the same time there was an equal possibility that the elec tro thermic effects of the current might have so lowered the resistance of the tissues ordinanly

capable of combatin, a mild infection as to have been re pon able for the patient's death from meningity mine days later

As chance would have it soon after this dishertening experience with the primary exercised of a meningioma in the manner mentioned two patients entered the hospital ridmost the same time each of them with a large ubfrontal timor originatin from the meninges of the olfactory groose. The account of the operation on the fir t of these patient (Surgical No. 8026) was made the basis of the Macewen Lecturel some five month later and the report of the other may serve our purpose here to illustrate the method of procedure.

Cist Th patient (Surge I No 28246) 188 top at fixeds above are fage I to had a fail through the fixed grown and more folloring an unjury five years before her admission she bigan to appear the administration in the sense of smell which so no became wholk lost Of lat she had be n having cur us statucks of numbers at stiff ces in the Ift side of the fixed grown several content of the state of the fixed grown and the fixed grown and the fixed grown and the state of the fixed grown and

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F) 12 Case 3 To show on median section a large symmetrically placed offsetion, groove menin ioma the left half of which had been attacked by electro-urg cal methods which pro-ed ineffe tive from the excessive vascularity of the lesion

be abandoned owing to excessive bleeding from the surface of the excavation

The case was given up as surgically hopeless and recourse was had to radiation which accomplished nothing Mental symptoms became progressively more pronounced during the succeeding 8 months and on the bare chance that the lesson might be amenable to electro surgical methods it was again attacked on Warch 8 19 7 At this time in the course of a nine hour operation wholly under local anæsthesia the chief mass of the growth to the left of the falx was thoroughly scalloped but interstitial bleeding in the depths became increasingly difficult to control and withdrawal with a transfusion was necessary On the following day we were forced by undue bulging of the flap to re elevate it and to remove by suction a sufficient amount of the in filtrated and dislodged growth to restore normal tension but bleeding was started afresh and in spite of another transfusion he succumbed some 12 hours later

At autops, it was found that only the left half of the large growth had been in large part removed. The median ection of the brain shows (Fig. 72) the dimensions which one of these tumor growths may Our experience with electro surgical methods was wholly insufficient at the time to enable us to deal with such a highly viscular and formidable lesson. Bleeding was if any thing accelerated rather than checked when the attempt was made to coagulate the raw surface after removal of each scallop of tissue for the growth was soft and the charred surface tended to cling to and come away with the electrode.

The growth nevertheless might possibly have been removed without undue difficulty in 1924 when it was first exposed had it been approached from the right rather than the left side had we uncovered the tumor more fully by removing the overhanging shelf of the frontal lobe and had we known at the time that the vasculanty of such a lesion could be reduced by the slow process of surface coagulation before its piecemical extirpation was begun

Obj. it is the was nothing to shot except a omplete ano min and bilateral pip fleedema of los gr. le. A slight enlirgement with erosion of the sellatur: in la minute area of calefication to the fit of th. midline just also e the olfactor groove sligl it) ba k of th. crista grilli were apparent on the st. scopi no tgenograms.

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i fi m h cal mili p fi ti seno i by limyb lid sell i h poed sello galls and making a cro s section of the falt. Finalls the remaining shell of the half of the tumor whe contained the calcified area was freed from the lift officiency groose dislocated out of its pocket and drawn out from under the falts in one prece (Fg. 8). As a last step the site of the dural attachment of the growth along cach olfactor; groose was lesh trated by brushing it with the el circle with the purpose of distroying so far as possible any remaining nests of cell. The flap was replaced with out Iriannees.

From the five hour operation during the last stages of which either hil been necessitated the patient made a perfect recover. The c was no condence of injury to any of the exposed network structures apart from a temporary diplipa de to a thirliner epal you the right sid (Fig. 9) high had probably been produced in the process of checking the bleeding cessel. Auston remained uniting red She has recently been examined (Tel. 19 y 13 to 19) and except for hir residual and mina she temporary for the residual and mina she temporary for the control of the control

The charred fragments of the tumor which were c ll cted and saved po sibly representing not mor than half of the gro th weighed 35.5 grams (Fig.

The outcome of this operation was more attributions in the similar called enthed in the Micewen Lecture for normally ion has been preserved. But the brilliant results in these two cases were soon offset by two other unsucces, full operations in one of which we were wholly brilled from inexpenence by uncontrollable bleeding and in the other by an indolant wound infection which ultimately proved fital. In both instruces thou he tumors had reached a large size with marked ment if changes and near blindnes the diamosts of an olfactory groove meningioma was unmit takable. The lirst of the circle in which bleeding got beyond our control follows.

CASE 3 A oung man (Surg cal N \$138) 31 years of g sustain d contin o sin an aut m bil aced nt in 1918 six v ars b fore his hospital adm s fo thi v r attribut d th sampt m of an unmistribable 1 ft oliacto v gro tumo fu han the course of time hal begun s riou ly to aff ct

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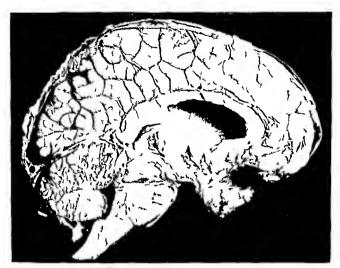


Fig. 14 Ca e.4 Med an section of the brain ho in didated left entricle with occlus on of foramen of Munro from uppurative ependy mitis to trace of tumor found. For compa ison with Figure 1

the tumor in the depths of the wound. The infection was unquestionably attributable to some slip in technique during the unduly long exposure of the open wound rather than to the secondary effects of tissue coagulation to which we at the time were inclined to ascribe it

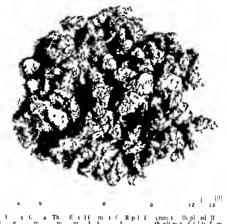
These four cases represent then our first essays to attack the large olfactory groove lesions which have been ordinarily regarded as moperable though many surgeons have of course exposed them at operation and have removed them in part. We have since had six other wholly successful operations of the same kind some of them with total removal of tumors as large as the last described. They however add nothing more from an electro surgical standpoint to the records given above apart from the fact that the operations owing to accumulated confidence were much less time consuming some of the more recent cases

having been conducted throughout under local annethesia

The discouragement produced by these two fatal operations for olfactory groove tumors recorded above had meanwhile been offset by the more favorable outcome of operations for large meningiomas in other situations less difficult of approach One of them was a subtentorial lesion that had once been given un as monerable as will be told

Case 5 The patient (Surgical No 2826 ) was a woman 46 years of age whose symptoms suggesting a cerebellar tumor had begun in 1920 In 19 2 a subtemporal decompression had been made by a surgeon in Montreal This relieved her headaches for a time but on their return a year later she was referred to the Brigham Hospital where one of my assistants explored the cerebellum and exposed what was thought to be a large inoperable glioma

She made an excellent recovery and was free from further symptoms of any serious import for the



The little metallip) for smmt llypled le mm it i thultmet felty fm

The story of the other olfactory groove tumor in which a postoperative fatality from infection occurred is briefly as follows.

Cr4 Tl patent (Surgi i \ 28344) ws an obes Js 56 ar of age who had been pat ally blindf mpima volteatrophy frt o verts and whe had omplete a man and dware I me tal hangs. Ih Vrvsh I the t Htal sp t of cale fie t on n th stalk of the tum ror th olfa tory groo

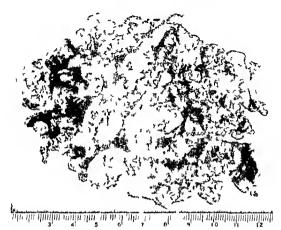
At th oprin n Wiloig a hug gr th much la ger the cptd as disled by the u ual tansfontal procedu. The loom a vated with the 1 trifed lop in much the sim pi cemeal fash n (Fg 13) descr bed in the pera t ve note on Cas In the process the fo tal horn

f the ventrel was opened and though the unintentional the es ape of fluid gave an abun l of room in wh h to work. The growth fin lly so fa as could be t ld vas remov d n its nti ety the d pressed chasm nd fl ttened optic t acts being left fully e 105cd. The pati nt though in go ! condition at the conclusion of the pr long 1 eigl t hour procedur the 1 stp t fwh h had r qui e 1

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Sh mal an yeell nt imme liate recovery but u happily the convail cance was complicated not nly ly a temp r ry hal tes ns p dus b t by an trued tille the ildor egiti el ctro l h l been insecur ly pplied If re wa alo a uperficial ou d i fect on it hich acr b ospinal fluil lak cre long d veloped Thil Lprit If rsome seveny els during hich ti e th inti nt remain lin fairly good cond to but on it spontan ous loue she rapidly ent lon hill and finally d dt om the after the op ration The autop's shot d'a suppurat te sta phylo occus p ndymiti No r sidual f the tumor in t be found (Lig 4)

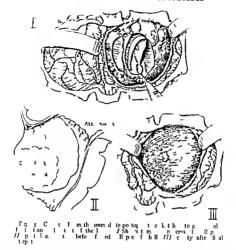
The lesion in this case was a large sym metrically placed meningioms e timated at circa 70 grams (the collected fra ment weighed 51 grams) but it fortunately was not particularly vascular The prolonged se sion was due largely to apprehension lest dama e be done to the vessel and chia m envelopin



F 16 Ca e  $_{\rm 5}$  Pre erved scallops (we ght 50 s gram ) of the circ 260 gram subtentonal meningiona



1 ig 17 18 Case 5 Tle patient on her d charge after operation for subtentorial meningioma to show incon picuous scar of the u ual cross bow incision



n vt four a h n h ada h s began to return and reb lla atax a gradually b came o pronounce l he could not fr ly get about \ \frac{1}{2} fragment f the tumor r moved t the op ation for h stologic l xam ation had m an h le i een shown to be an actively growing m n gioma In the belief that the gro with might b f wor ble for remo al by al ciro surgic 1 m th d slic a encouraged to return an l on 1 b a s 1 19 , the cerebillum was again posed and un l r loc l anæsthesia a et ea 60 gram m m g om vh h almost filed th poster or fossa an I had t m natta hment to the lateral sinus a d r suf c of th t ntorium as far forwar las the su ssfully vtirpat 1pi cem alimits entirety by th pro ss of scallop ng v th the elec tr fied 1 op (F gs 15 nd 16) Ih vound as usual as clos ds ur lv i layers vitl out drainage of the huge cavity Recovery was uneventful and heal g perfect (I gs 7 and 8) in spite of the temporary tendency of the cas to to fill with vanthochromic fluid which mad an occasional postoperative pune ture necessary

Another case of precisely this same sort in which an exceedingly den e fibroblastic menin

gionn had been once exposed and abandoned as inoperable his since been similarly and successfully operated upon the patient who was doing well enough as the result of the decompres ion having been induced neverthe less to return for another trail

We may now press to another far more accessible type of meningioma but one never theless whose very exposure may prove to be attended with exceptional risks. I ossibly none of these tumors are more difficult safely to uncover than the e which take their or in from the meninges at the outer end of the sphenoidal ridge near the pterion where the middle meningeal vessels group or perforate the lower corner of the partical bone. The region may be excessively vascular and even the preluminary ligation of the external carotid has little influence on the bleeding that may be set going. Moreover there are apt to be creamil endostoses that project into the core

Ten operations in surgery are lilely to be more hazardous to offer more technical dif ficulties or to put a greater strain on the judgment and resourcefulness of a surgical staff To be sure procedures of this sort have in the past been successfully carried through by other than electro surgical meth ods but hardly in one sitting The steps of the operation have possibly been given in unnecessary detail for those who have had personal experience with similar tumors and who are already aware of the difficulties The principal reason however for including the case here is to call attention to the fact that epileptiform seizures were produced by the passage of the coagulating current through the dura and to give warning of this possi bility Fortunately the convulsions occurred before the dura was opened else they might have caused serious trouble from the accentuation of bleeding and cerebral protrusion

To show that the successful outcome of this case was not exceptional a few weeks later the outer margin of another still more deeply situated meningioma (Surgical No 28598) arising from the sphenoidal ridge was stum bled upon in the course of an exploration for a presumed tumor of the right frontal lobe that had been wrongly localized by misin terpretation of the ventriculograms circa 100 gram growth shown in the accom panying photograph (Fig 3) in the course of an eight hour session including the ventric ulography was thoroughly excavated col lapsed and cleanly removed after which the residual dura which could not be removed on account of its dense attachment to the wing of the sphenoid was thoroughly dehydrated by spraying with the ball electrode covery was perfect

In another place and in another connection1 has been described how electro surgery may be of aid not only in the primary attack on smaller meningiomas in inaccessible situations but as a means of destroying the sometimes irremovable cell nests in the adherent dura and bone But what has already been said will perhaps be enough to show what may be done with these particular lesions

During the two years we have hid an unusuil number of meningiomas thirty nine patients having been admitted for their primary opera tion and twelve for a secondary operation or for recurrent symptoms In all but four of the cases the tumor was removed in a single session with six (11 7 per cent) fatalities four of which have already heen mentioned. This is a high mortality percentage but many of the opera tions would not have been even ventured upon at all or would have been given up in course as unduly hazardous or impossible of accomplishment by other than electro surgical methods As four of the fatalities were due to infection it must be confessed that on this score the electro surgical methods served temporarily to increase operative risks but this of late appears to have been wholly overcome

The Blood Vessel Tumors What has been said above regarding the risks from loss of blood in dealing with the larger meningiomas applies still more to the tumors that are actually of angioblastic origin for many of them are truly formidable lesions even when attacked with the aid of electro coagulation as we soon found to our cost On March 10 19 7 the day after the successful extirpation of the large Sylvian meningioma that has been described we ventured to attack a rapidly enlarging capillary humangioblastoma of the fourth ventricle. An account of the case has been included in a monograph which deals with the subject of the blood vessel jumors as a whole and a brief resume will suffice for our present needs. It was the first occasion in which we had used the highly damped des accating current for the purpose of superficially dehydrating and shrinking a vascular growth before its removal

Case 7 After many vicissitudes from mistaken diagnoses the patient (Surgical No 28406) a young woman of 3 years had finally been operated upon in September of 1925 at which time a large cerebellar cyst was exacusted and a highly vascular nodule disclosed in its base. An attempt to remove even a small fragment of the lesion for histological iden tification led to bleeding that was checked with great difficulty She did well for a year when owing ChglBdyTm using I mith blood ssl I the Agmatsu mall mito d himag blast mas CC. Thimas Spingfild III 98 (Cas XII)

Chgilirvy dightle The might child the the in lie with if y din fip might plice in the with if y din fip might plice in the with if y din fip might plice in the middle diets mb dish middle gdeso Ab Ophth (Chg) well 199

of the tumor and should these be torn out when the flap is clevated the bleeding may at times be most difficult to get under control

A good example of such a tumor that had progres ed to a fatal issue without surgical intervention is the famous case so often re ferred to in the writings of Byrom Bramwell (Fig. 10) We have had a number of typical examples of the e tumors in our series some of them successfully enucleated in successive sessions but I had particular reason for being gun shy of them having had the shocking experience a little more than two years ago of lo ing a colleague a young Boston physician who had died on the operating table from the loss of blood caused by the mere reflection of the ragged and tumor involved bone flap which adhered to the vascular surface of the tumor. While this harrowing episode was still vividly in mind the patient whose history follows entered the clinic

CASE 6 Amarined woman (Surgeal No 286a) 44 v ars of age had the clussical symptoms and signs of a lo left Sylvan fi sure meni g oma asso c at 1 with contralater I Jacksonian surrures begin ming in the fac. Ther was aphasia with slight right facial palsy and a gight homonymous heminiopista. The Vrais sh wid the typical endostos project g i to the stall, of the tumor at the outer can of the sphen dal r lige with enormous ensiron mental diploti sinuses and depended meningeal channels.

Pr parations we e made for a critical operation with a do or prepared for transfusion and masses of pe toral mu cle s cured from a breast amputation sch dul d f r the same hour

On Wark 18 19 under local anyethesia a left osteoplastic flap vas outlined with some dif fulty and h I vat dit broke off only partly exposing the highly vascular du a over the tumor Ble di g as e cess e in spite of pressure and the abundant implantation of muscle which was at Since th se measures vere insufficently effects e they were abandoned and with the feld kept reaso ably dry with the sucke the effort was mad to coagulate the dural e el This had the desired effect on the ble ding but the cirrent crused a sete cos ul 10 : beginning in the right face and necessitating the inhalation of ether for its co trol After some delay and after onse ousness had been regained as id contilsion was produced by th fu ther coag dation of the ne geal tessels and from this time the patient was kept under other. The remainder of the tumor involved by e overlying the core of the les on and extending down into the sphenoidal ridge was then removed piecemeal each bite of the rongeurs being followed by sharp ble d

ing fortunately controllable by coagulat on F nally the subtemporal area of involved dura was fully uncovered

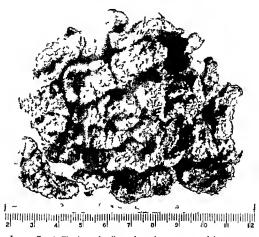
The patient's blood pressure by this time had fallen off markedly, and preparations were made for refusion of the collected blood. Meanwhile with the proposed getting some idea of the surface tent of the lesson in anticipation of the probable necessity of a second stage performance one or testing incisions were mide through the dura supposid incisions were mide through the dura supposid incisions were mide through the dura supposid incisions were mide through the dura supposid beyond the periphery of the lesson. On each occasion soft tumor rather than brain was exposed fritte growth provide to be unexpectedly large fully ten on timeters in its surface d ameter. The idea of incicing the area of adherent dura with the intent of allowing the lesson to extrude between to operative necessals was therefore abandoned.

The attempted transitusion had been a failure from mabilisty to get into a sufficiently large via but as the pressures by this time had begun spon lancoutly to r turn the chance was taken of it ast starting with an intracaposaler amuleation Accordingly. Ith the desiceating current the dura was incised directly, into the heart of the tumor from which generous scallops of tissue were sue c savety soo ped out with the electrified loop. The enter of the lesson fortunately proved to be down asculantly and the excavation was carried suffer all far to permit of the partial collapse of it shell

The gro th vis then encircled by an incusion through the intact outlying dura. It chief difficulty live in getting a free dural margin in the deper more vascular and more inacces ble spin model reg in without further loss of blood which the pair int could hardly have stood. But the difficulty is so ercome by making the d is no of the membrane bet een a succession of cured clamps and by scaling the severed margins with the current passed along the clamps before their removal.

The shell of the grouth thus fre d began prompt by to extrated and it was a simple matter to collap e it as it was brushed anat from the nervous Lisu forms gits nest such small visels as were found to enter the surface of the growth bei gpicked up and cangulated as the enucleation proceeded. The shell of the gro th was finally d sledged from its bug pocket with scarcely any nurry to the pas arch nood the geatly enlarged and dislocated Sylvian we sels lying eyosed in the depth of the cavity. While the esteoplastic flap was being replaced und the wound closed a transition of 5 o cubic e ntimeters of whole blood was g en MI told it is as a seven hour session.

The photographs of the preser ed II surs [Figs of I and 22) which we ghed 128 grams and probably represented a erce 50 gram tumor together vith photographs of the patient (Figs 23 and 22) who made a prompt and uninterrupted recovery will til all that is additionally needed to complete the story



I ig o Ca e 6 The clu tered callop of at as they were preserved that were excatated f om the heart of the tumor (cf  $\Gamma$ ig 21) before it collapse permutted removal (weitht § 5 gran)

CASE 8 The patient's history (Surgical No 28582) occurs as Case I in our monograph on the blood vissel tumors and it will suffice to say here that she had first been operated upon for an emer gency cerebellar sandrome in 19 3 the tumor not being brought to view. She had pulmonary tuber culosis and a cerebellar tuberculoma was suspected. As a result of the decompression she did well for nearly three years. In July of 19 6 at a secondary exploration a huse, unputsh lable harmangurance.

nearly three years. In July, of 10  $\delta$  at a secondary exploration a huge unmustakable harmangiona oc cupying the larger part of the right crebellar fossivas exposed. Because of its vascularity, it was not exceptionally exposed to the remove in fragment of the lesson for histological verification. From this operation she had received but littlef iny benefit and aware that she was rapidly losing ground she was encouraged to return.

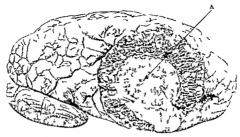
At the third operation on 1911 19 10 , under local anesthesia and in spite of her highly advanced ecrebellar symptoms the desperate procedure of slowly attacking the huge angiomatous growth by the process of desecution and corgulation was successfully carried through in a seven hour session with three transfusions in course

She made all told a satisfactors surgical recovery and had it not been for her by this time advancing

pulmonary tuberculosis the prognosis would have been favorable. She died at her home from some obscure cause without autopsy seven months later

Two other patients with a growth of precisely this same formidable sort have since been seen through with better success one of them a young boy whose tumor had been previously exposed and considered inoperable the other an adult in whom the viscular growth was successfully and radically at tacked by dehydration methods on its first exposure

We had hoped that the angiomatous mal formations a discussion of which comprised the first part of our aforementioned mono graph might be similarly attacled by electro surgical methods but in the single case in which the attempt was made we had the misfortune to spark through one of the superficial vessels of the aneury smal lession thereby crusing troublesome bleeding. With



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t a r tu n of smptom th cerebellum as again y s d tr; r or an 1 the cyst exacu tel but the turn r to lul hild doubled n size and efforts to d al. thin t g at 1 to alarming hamorrhage. The cliffod d by this see nd operation lasted for only ser mo the sand the ugh under ord nary cirumstan is the same ould have been right in the time that the same but have been right that the might walls! I will carbonize a less not the try.

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fou d by spraying the highly viscular surfac of th tumor with the coagulating current th lall I tro! being used for th purpos that th su fac c uld be shrunk n and charr I as th cr bellu wa gradually brushed avay from it n 1 hy log al ff ts b ing produce 1 By thi m th d v h t epr s nt d po sibly th uter half f ) as grad lly brought nto view and ogultd The tral porti n of th expose 1 th w s th n pa tly scalloped but such a degree of ll d g oo b gan to occur from the raw cavits s n c s a y to take muscle from th rati ts l g for purp ses of mplantation bef re it ull b ontr ll d The h ad ard port on of the I on va f ally tite I out sufficiently to perm t r br pin I flu d to scape from the dil t d iter and as the patient had by the time begun to complain of the d comforts of h r po tion on the table the r pla d and closed in the usu l d tail after what had been ov rafve hours ss on

We wer at the time unwater of hat effect the at engined red by the long process of coagulatin might have upon the medila. Nor field know how well the large schar which was left behend ould be tole at eliby the enveloping it sue. Our appr hensions on these see a happily wire.

gr und 1 sh m 1 an imme late excell nt recover) and sho el no signs of reactin At the e d of a seek's time f aring to ait long rl st ie should be unable to unfild the trisus e silve the tumor wa again e nos d thi time und r ether anxithesia and after the r mainder of its surface had been treat ed in the same fashion as before it as possible tot lt outward the charrel mas ther by e posing the full 1 gth of the lilated and nake I floor of the fourth ventuel The base of the turn reas then el mared off d hydrated n I remov d from its attachm at ju t abo th calamus scriptorius (Fig 26) The jat ent mal an ell nt recov ry from he anas th tie and gas ed a good night but arly the net m rning she b g n t have some r sp r tory diffeul ti s fr m which sh succumbed on the mo ing of Wich S

In this case we had made a de perate throw and failed whether from poor judgment or mexperience need not be discu ed Had the same method been employed when the tumor was smaller the operation might well enou h have been carried through to a succe stul is uc This we have had the good fortune to demon strate in a more recent case A was explained in our monograph on the subject of the e blood vessel tumors the true heman noblas tomas are invariably found in the cere bellum some of them being cystic and ome of them largely solid le ions And a month after the fatal operation described we had made sufficient progress to encourage us to send for an old patient known to harbor one of these formidable le ions of the latter type



Figs 23 4 Case 6 The patient on her di charge howing slight re idual right facial palsy which soon di appeared

out further experience it is impossible to tell whether vascular malformations of this nature can be effectively attacked. We have found experimentally however that vessels of considerable size may be sealed by compression with the ball electrode and the employment of a slowly coagulating current. All of this needs very careful further study.

Cerebral Gliomas Our early electro surgical experiences as already stated were largely restricted to the development of the methods of treating the meningiomas in the manner described and our first essays to deal with the tumors composed of elements of the nervous system were unsatisfactory. However what we might some day learn to do was fore shadowed by an occasional experience like the following in which the evposed surface of the lesion lay uncovered in the wall of a large cyst.

CASE of The patient (Surgical No. 28547) a young man seventeen years of age had been previously operated upon in Jine. 19.4, At that time he presented unmistakable symptoms of a left tem poral lobe lesion and at the operation a massive subcortical glioma of a comparatively benign type (astrocytoma) was for the day radically attacked and in large part removed though because of bleed

ing a visible portion of the tumor in the depth of the lobe was left behind. The flap was replaced leaving a subtemporal defect

The patient made an excellent recovery and had been steadily at work as a farm hand until a month before his readmission at which time the sub temporal decompression began slightly to protrude and some of his former symptoms to return He reported this fact and was requested to re enter the hospital for examination

He proved to he in such excellent physical condition that under ordinary circumstances one would have felt inclined to advise delay for in spite of an occasional headache he was well able to continue earning his livelihood.

At the operation on April 14 19 7 on once more reflecting the old bone flap under local anæsthesia a huge temporal lobe cyst containing at least three hundred cubic centimeters of xanthochromic fluid was encountered and evacuated. With the cutting current a long incision was then made quite blood lessly through the overlying fibrotic tissues at the site of the old decompression. In the floor of the widely opened cyst was seen a solid mass of recurrent tumor the size of a hen's egg This large mural tumor was removed in two large fragments (Fig 27) with extraordinary ease by the aid of the dehydrating current The growth appeared to lie in the fork of the dislocated ventricle which was widely opened in the process of its removal. The tissues actually melted away miraculously before the sparking point in a manner that would not have



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Cerebellar Gliomas Gliomas which arise from or involve the roof of the fourth ven tricle are very common lesions particularly in childhood as the writer has elsewhere taken pains to point out ¹

Even before we began to employ electro surgical methods of operating we had begun radically to attack these tumors and mruy of them had been successfully removed the ultimate prognosis varying in accordance with the pathological nature of the lesson whether a highly malignant medulloblastoma a less malignant ependy moma or a relatively being astrocy toma. It is perhaps incorrect to speak of them as fourth ventricle tumors rather than as tumors of the vermis though in their removal as was described above in connection with Case 7 the widened ventricle is usually laid bare from the distended iter to the calamus

The operations are time consuming tech mically difficult and demand full bilateral exposure of the cerebellum oftentimes with removal of the laming of the atlas. It is impossible to carry out the necessary manip ulations through the single vertical or transverse incisions that have recently come to be advocated for cerebellar operations. The cruy of the enucleation lies in the control of bleeding from the choroidal branches of the posterior cerebellar arteries in the tonsillar region adjacent to the calamus for it is from this source that these median tumors appear to receive their main blood supply Should one of these vessels fail to be clipped or congulated before its division it is often most difficult to secure the bleeding point and interstitial bleeding in this region is attended with great danger

The posterior end of many of these tumors has exposed between the tonsils so soon as the cisternal arachnoid is opened. Others are only exposed by drawing the tonsils up out of the foramen and separating them so as to bring the calamus and triangle of Magendie into view. Still others are not visible on the surface but their presence is betrayed by an innatural prominence or widening of the invula. Under these circumstances the elec-

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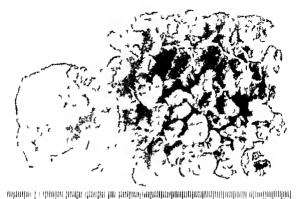
Fig 6 Cae 7 The remains of a lar e capillary hæmangioblastoma of the fourth ventricle charted and shrunken by electro de iccation before its removal at a cond session with fatalit from pneumonia

tro surgical methods can be effectively utihzed in place of the scalpel or blunt dissector in making the long median incision through the vermis down to the tumor which even when large often lies at a surprising depth

When the surface of the growth has been well exposed by brushing each of the divided correbellar hemispheres to the side it may be primarily excavated in various ways depending largely upon its consistency. When it is too soft to be hindled as is true of most of the medulloblastomas the sucker must be largely resorted to but even under these unfavorable circumstances electrical methods are constantly called for to control bleeding points more particularly as one approaches the vascular stalk of the tumor in the region of the calibration.

These operations for fourth ventricle tu mors are relatively common ones there having been thirty five examples verified during the past two years few however of such seriousness as that for the fourth ventricle hermangioma (Case 7) described above. One or two of the cases in which the electro

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This happens to have been the first cic in which a worden table and wooden spatials were employed and the avoidance of any discomforts or plassological reactions was assumed to these accessioners. Here importance was unduly emphasized as we now know but under the encouragement of this experience we began pridually to gain confidence in attacking cerebral gliomas of varied sorts and in time learned with proporth modified currents how to make transcortical incisions with comparative bloodlessness and without getting the electrode gummed with tissue in the process. As a result of this we have become even more radical than heretofore in

f thas fh thishwill fthit it lib b willy p d by h p i the paih lpl b m d p i h b g by fit d by i the removal of the a tumors for the former methods of block dissection were apt not only to be somewhat messy and bloody but there was alway the likelihood of inoculatin the raw its use with viable tumor cells—arsk greatly les ented when electrical method of di section are used. The detail of pio cedures of the type need hardly be gone into for they differ greatly from case to case and they are unquestionably capable of vast im provement in technique which will doubtlessome to be perfected given time and expensive.

It may suffice to ave that the removal of the more contributed by the theory of the brain (frontal temporal or occipital) may be enormouth facilitated by electro surgical manipulation and should one apprehend that the nervous tissues lining the raw cavity still contain tumor or have been infected by implantation of tumor cells as a last step in the lobectomy the raw surface may be gone over by the loop and as many additional thin layers of tissues of the services and the services as the services are the surface may be gone over by the loop and as many additional thin layers of tissues.

Cerebellar Gliomas Gliomas which arise from or involve the roof of the fourth ven tricle are very common lesions particularly in childhood as the writer has elsewhere taken pains to point out 1

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unnatural prominence or widening of the uvula Under these circumstances the elec-Aplyxxx 55 554 In disc

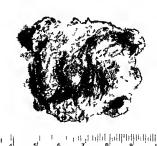


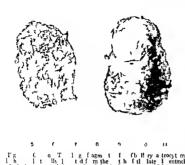
Fig 26 Ca e 7 The remains of a large capillary hemangiobla toma of the fourth ventricle charred and hrunken by ele tro de accation before its removal at a second session with faialit f om pneumonia

tro surgical methods can be effectively uti lized in place of the scalpel or blunt dissector in making the long median incision through the vermis down to the tumor which even when large often lies at a surprising depth

When the surface of the growth has been well exposed by brushing each of the divided cerebellar hemispheres to the side it may be primarily excavated in various ways depend ing largely upon its consistency. When it is too soft to be handled as is true of most of the medulloblastomas the sucker must be largely resorted to but even under these unfavorable circumstances electrical methods are constantly called for to control bleeding points more particularly as one approaches the vascular stalk of the tumor in the region of the calamus

These operations for fourth ventricle to mors are relatively common ones there baving been thirty five examples verified dur ing the past two years few however of such senousness as that for the fourth ventricle hremangioma (Case 7) described above. One or two of the cases in which the electro

There the primative file to did it is the did it is the did it is the did in f m th tly fid Of thee p-d bout h th [t] late 1 entricle



tttdthem al dul f lig tempo llobe es t urgical adjunct was first employed may serve

in illustration

CVE 1 The patient (Surgical \ 8601) a hill eight a of g as admitted on Sept il r o with a chok d disc of 5 diopters 5 cond hydrocer halus and a full blown cerebellar syn frome o dy ne d th t an operation was performed thout the customary d lay for detailed study Du g th course of th sual e ploration under local and th sia with a ventricular puncture to di mi sh n s stas s a highly asc ilar median tumor a troed It was thought to be a ham ngioma nd as c s dered to be 1 operable A small f ag m nt ft u emoved fo v rification proved subse quently to be t o greatly filtrat d to determine the list log al type of ksion. She was nevertheless g en a se us of A ray tre tm nts and didextremely ll for the n xt six months during which she re ed f e from symptoms

He mother r port d 1 1pril 10 7 that she had b gun g n to have occasional attacks of morning om t g and in the hope that the tumor might possibly b r moved by electrical methods and believe g that it vould be better not to delay until the be efficial effect of the decompression had been holly lost the child was readmitted for a secondary operation

The clinical history contains the following note which was dictated immediately after the operation on April 1 19 7 when the sketches (Fig 30) were made and the steps of the procedure fully described It tells more vividly than would now be possible or per

missible the impressions of the case at the time

Of the extraordinary and revol tionizing experiences we have have g in the past month this case think exceeds them all

The child s nee her re entry to th hosp tal after a former d compression th subsequent radiation has been I solutely free from a v evilences of

tumor I had almost begun to fe 1th e hall better postpone fu ther in a ntion as unnecessary on the assume tion that the tumor must have bee ab rb d by the \ ray I had not the I ghtest suspic in that we wire to find a far larger tumor tha orign lly exposed

I am not at all su e whether the tumor that vas found is a hamang oma after all it may po sibly be a me lulloblast ma or indeed an astrocy toma There was no evide ce of the great ascularity which caused us to cut short the primary operatio and

which may possibly hav been due solely to stas I sen so anthout the el etrical devices I probably would not have done more than to give this gro th a partial remo al by suction and probably would never have gotten it very fully in view particula! the neighborhood of its lower pole for h re th attachments were dense and vascular and bl d at a touch but they simply melted away b for the dehydrating current

So far as I could see for the first time one of these fourth v ntr cle tumors as remond a tact nathout lea ang behand even a suspicious tag of to sue In the process a new manceu re was em ploye I in that the growth after being freed as eff ctively as poss ble on the near de well up under the tentonum as then pressed to the opposte side by the wooden spatula. The lateral wall of the dilated ventricle thus put on the stretch then el ctrically opened by a bloodl ss incisio the full 6 centimeter le gth of the entricle This made it possible for the tumor to be tilted out until the opposite wall as shown in the ketch (Fig 30) wa in its turn similarly divided thereby permitti g the

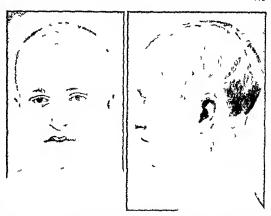
growth to be lifted out in its entirety (Fig 31) There is one important point h ch should be mentioned in that the dehydrating current proved d stanctly a better method of separating the growth from the adjacent cerebellum tlan the ordinary method of brushing it a vay for owing I presume to their relatively greater content of water the ner your tissues melted away before the sparking cur rent leaving the surface of the growth clany exposed In the customary procedure of diss cting the brain from a lesion of the sort one i likely sometimes to get more deeply into brain than I desirable or on the contrary and what is still worse occasionally to break through the surface of the tumor

This brief prelimi nary statement as it occurs in the record tells about as much as does the detailed ac count of the operation that follows it apart from the fact that it dismisses with slight reference the difficul ties of re exposing the growth because of the dense adhesions due to the old operation in the separation of which the cutting cur rent proved infinitely superior to the scalpel Nor does it mention the fact that the vas cular surface of the growth was sprayed and shrunken with the

damped dehydrating current as it was grad ually brought to view. The tumor proved to be an astrocy toma composed mainly of proto plasmic elements which gives the case (Γigs 32 34) a most favorable prognosis

When these fourth ventricle istrocytoms are accompanied by a cyst the problem is greatly simplified particularly if the cyst lies superficial to the mural nodule so that it lies fully exposed. Examples of the manner in which these lesions may be dealt with under these favorable circumstances are shown in the accompanying sketche one (Fig. 35) shows a comparatively small mesially placed nodule attached to the roof of the ventricle the other (Fig. 36) shows a larger mural tumor which was laterally placed in the right hemisphere

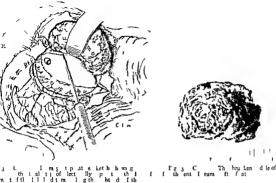
In past years surgeons were apt to con gratulate themselves on the mere evacuation of a gliomatous cyst which of course leads to an immediate brilliant operative result. But painful experience has shown that the cyst is not an evidence of degeneration of a lesson and that somewhere in its wall lies a tumor.



Figs 28 29 Ca e o The patient is day after operation for a recurrent temporal lobe tumor showing fullness of subtemporal region due to temporary tendency of cerebrost malfiul I to accumulate becau e of the widely opened ventricle

nodule from the surface of which the van thochromic fluid evudes and in time the tumor unless it is removed may come wholly to replace the former cyst Under these cir cumstances its total removal at subsequent operations becomes increasingly difficult with each attempt because of the tissue adhesions which form I have under continued observation a patient who as a lad of mine year was first operated upon in 1907 when I jubilantly enucleated a cerebellar cyst Since then he has grown to young manhood but in the intervening twenty years owing to recurring symptoms due to the progress of his slowly infiltrative astrocytoma he has been subsected to six operations until there is little of his cerebellum remaining. Had the nature of the process been appreciated in 1907 it might even at that early day have been removed at a primary session and both patient and surgeon been spared much trib ulation

When these fourth ventricle astrocytomas are found at their first exposure to be un accompanied by cysts the problem is quite



er one. It is rare that thes can be ed in their entirety as in the operation see to that his been recorded in detail isually necessary partly to excavate the before it can be bru hed away from rebellar hemispheres without producing on its can be supported by the manupulation of the tumor presippin it mut to be avoided because of its on over the medulla the re-piratory nin min minny cases already compro

being of ill upset
evample of one of the e solid tumors
happened to be an unusually firm
lobla toma but which on May 17
had been thus treated by primary
ical evolvation before removal is shown
accompanine photograph (Fig. 37)
ne operative sketches (Fig. 38) give some
e in Figure, of the issue was electrically
und it two halve removed in succes
a e. On other occasions it may be
a e. On other occasions it may be

difficult or imposible to remove the

nor portion of the lesion owing to its

dense attachment to the region of the cala mus An example of this is shown in Fi ure 40 the removal of the residual nodule was given up as too hazardous

The general run of soft medullobla tomas that occupy this same region are less suitable for electrical scalloging and are most effect The technical wely attacked by suction problems necessarily differ considerably from case to case and each tumor has to be ur gically manipulated according to its peculiar ities Fourth ventricle tumors are alike merely in the fact that the chief point of particular danger lies as may be re empha sized in the method of controlling the chief vascular attachments which lie along ide the calamus for which purpose electrical coa u lation is more likely to be effective than the employment of clips

The Acoustic Tumors Because of their characteristic symptomatology the acoustic neurinomas are possibly the mot easily recognized of any intracranial tumors. More over they are inherently bent in lesion. And yet from a technical standpoint particularly







I1 3 34 Cae to Patient May 5 , at time of di harge. The build pat h a die to the former radiation which so far as known; ineffective for astro 5 tom?

when they have attained a large size they offer greater difficulties than almost any other tumor with which the neurosurgeon is obliged to deal Though the usual run of these patients came to operation during the first few months when we were grounding our selves in the first principles of electro surgery difficulties were experienced owing to the spread of the current to the nerves enveloping the tumor physiological responses being produced which were most disturbing to the patient Consequently about all that the electrical adjunct could be used for was as a purely supplementary measure for coagulating dural margins and possibly for making the primary incision into the tumor and sealing some of its surface vessels

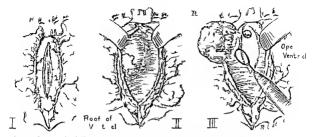
However during the past six months we have come to modify our traditional method of exposing these awkwardly accessible growths and as a matter of fact we were forced into the maneous re owing to the urgent postopera tive complication in the case to be described

CASE 11 The patient (Surgical No 30497) a foreigner was admitted with an advanced circ bilipontile syndrome. On account of marked men tal changes he was wholly uncooperative. He was beditidden because of his atavia nearly blind from secondury atrophy and there was extreme dis

phagn: The operation had to be begun under ether narcosis which he took hadly lis respiratory embarrassment was such that in spite of a ventricular puncture; there was sufficient stass to cause undue loss of blood.

The tumor a large one was finally well enough exposed to permit of a partial intracapsular enu cleation a slow process as the growth was him and vascular. Owing to the patients condition it was necessary to withdraw without having accomplished much more than a decompression. The wound was closed none too easily and as is custo mary the patient was left face down on the table to await the full recovery from the anesthetic. This he failed satisfactorily to do. Cradually respiration became still more embiraries of with increasing cyanosis a falling blood pressure and rising pulsarate. It was evident if his were to be saved that the desperate chance would have to be taken of reopening the wound—always a most disheartening procedure.

I reparations for resuming the operation were mide and the cartfully closed wound was reopened. The evident cause of the compression was a swollen ordematous and infiltrated cerebellar hemispher, overlying the growth for on its release the patients respiration and color almost immediately improved. There was nothing for it but to remove a large crescut of the hemisphere. This was accomplished with amazing ease and quite bloodles it with the dehydrating current. The tumor which previously had been awkwardly exposed under the margin of the retracted hemisphere, then lay fully barid to view. It was radically excavated with the loop electrode until its capsule could be o fully collapsed electrode until its capsule could be of fully collapsed.



I 3 Op t keth (S gr l\o 3 o) hw I th primary the ghwide edu ulator ter if feyt II the prince yet hown the first retrievath a flat musal odule III loop be ediforting lat tribing to the dit in the loof it to the late of the

that the antern reportion of the growth which we side displayed the point in the tentor all opening

uld be rl ased
Though the ls of blood had ben cons d rable
and though the two oper tions had co sumed or
inchours the patient be gainnium diately to in p oce
and a month lat r he was abl to alk out of the
p ptal n unusually go denditi a for the 1 tm
of n acoustic tumor that had att ed su h a
le res ze.

What was particularly unexpected in this man's case was the fact that the postoperative cerebellar symptoms were if anything le's marked than one usually sees in comparable a ces when the cerebellar herm phere has merely been retracted and left in place. We had fully anticipated that the removal of what must have amounted to practically the lower third of the hemisphere would leave the corre ponding leg and arm so itavic that they would be practically ucless.

Since thi illuminating expenence we have adopted this method as a preliminary step expo ing other acoustic tumors (Fig. 41) and have not only been able thereby to get a far better primary view of the lesson but have come to feel that in advanced cases a partial cerebellar extription is in the long run less likely to accentuate pre existing ataxia than did the inevitable contusion of the lobe that vas formerly produced by the method of retraction.

How far one may go with the adoption of this principle of removing the uninvolved shelf of brain that overlies a tumor rather than merely retracting it or incisin, throu h at down to the surface of the tumor with subsequent separation of the incised ed es remains to be seen. The temptation will be great to extend the principle in regions where cortex registers no important function now that the excision of tissue is so greatly facilitated by electro desiccation And the same thing applies as well to lobectomies for the mass extirpation of gliomas-a principle which should of course not be carried too far The mere prolongation of life unless it can be made better worth living is not an accomplishment for the surgeon to pride him elf upon as has often been emphasized

As Dr Bones preliminary note was written in May 19 7 it has seemed appropriate to restrict the case reports in this paper so far as po sible to an account of our early expenience which hind begun to accumulate during the pring of that year. In all of the experations the active electrode was used while attached to the hand made pistol grip which he had devised and carved out of balente (Fig. 42) the current being shot by the surgeon. Meanwhile a second person. The Boyle himself in those instructive divisions.

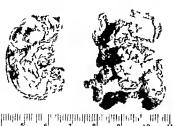


Fig 37 An unu ually frm medulloblastoms of fourth ventrale (Surgical No 8,54) removed after primary excavation by calloping to reduce the size of the le ion

controlled the switchboard and modified the character of the current in ways he thought appropriate to the surgeon's particular needs

of the moment

We had originally discussed the possibility of having keys on the handle of the pistol grip which would enable the surgeon himself to change and modify the currents employed so that an operator at the switchboard of the apparatus would no longer be required But as a matter of fact we have tended in quite the other direction. For we have come more and more to dispense with the pistol al together and to use the electrode us a pencil and this for reasons to be explained has made it necessary to take on an additional assistant instead of eliminating one as we originally planned to do

For gross work the pistol does well enough and it is of course a great convenience for the surgeon to have the current under the immediate control of his trigger finger. But for delicate dissection in dangerous places around the optic nerves and chiasm for example the movement of the electrode with the pistol in hand compared to the movement of an instrument held in the fingers like a pencil is exceedingly awkward. One need only attempt to write his signature with a pencil inserted in the muzzle of a revolver to appreciate the difference. We consequently have been obliged to take recourse to a foot switch which has been supplied with the

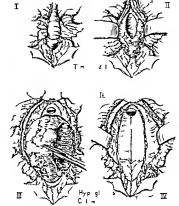
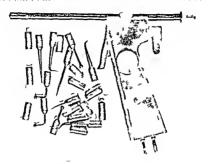


Fig. 38 Operative sketches (reduced A) to show steps in the electro surgical removal of a solid fourth ventricle tumor (Surgical No. 3754). I shows appearance at primary expo ure II after splitting the verim and removal of primary scallop. III the partly scalloped tumor being di lodged II: the bed of tumor with widely opened entricle after removal of its roof together with tumor.

newer models of the apparatus or better still to have an extra assistant eleaned up who not only holds the pencil when not in use but who often plays a far less passive role than this as may be explained

On one oceasion (on April 26 10 7 to be exact) a large right frontal glioma of a somewhat unusual type was exposed and attacked by electrical methods. In this proeess which necessitated the removal of the larger part of the lobe and the laying bare of the anterior falx an unusual number of vessels were encountered and since the operator's left hand was engaged in careful retraction of the brain while the right was holding the pistol the coagulation of these vessels though they were plainly brought to view was difficult to compass. The need was felt for some sort of a split pointed electrode that could be used for making incisions when closed and yet could be opened in the fashion of the usual duck billed forceps so as to pick

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vessel of considerable size too large to be sealed by the dehy drating current happen to be divided in the process of incising the brain or of scilloping a tumor it cin without flooding the wound be allow d to play direct to into the sucker while the point is picked up by the forceps down which the current is allowed to pass in the manner described

A beginner it his experience coincides with ours will often have difficulty in regulating the current of a to seal the bleeding point properly without so damaging it as to start bleeding after high times when too strong a current is used to coagulate a naked vein of considerable lize the steam caused by the deby fration may actually lead to an explosion exputure of the vessel wall. Until we learned largely to become these difficulties we continued to place rehance as of old on liver clips and though for the control of the larger vessel clip cannot be wholly superseled they are used to specify and the control of the argent vessel clip cannot be sholly superseled they are used to specify the cannot be sholly superseled they are used to specify the cannot be sholly superseled they are used to specify the cannot be sholly superseled they are used to specify the cannot be sholly superseled they are used to specify the cannot be sholly superseled.

1 Even a fairly large artery may be effect ively occluded without risk of opening into its lumen provided some tissue is picked up by the forceps on each side of the vessel and included in the dehydration process

There are times when solid timors of the meningioma type (cf Case 3) may be in themselves o highly vascular that when they are scalloped with the loop even with a highly damped cutting current bleeding from the base of the furrow may be senous And if this process has to be repeated over and over again without waiting to control the bleeding after each scallop is removed the patient will shortly have become too exanguinated to permit further process

We have recently been dealing with a hu e deep seated meningioma of angioblastic type with in audible bruit that required three separate stages before the shell of the tumor could finally be collapsed and disloid, ed (Fig. 43) The growth which was approve mately a 150 gram lesion lay deep in the left temporal fossa and was exposed by electrically excising the oval disc of temporal lobe that overlay it. In pite of a superficial preliminary treatment of the surface with a coagulating spray when the growth came to be scalloped with a damped deby drating

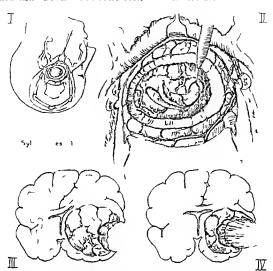


Fig. 43. To illustrate the success to stages of the electro surgical removal of a large vascular memiagoima occupying the temporal forsa and an ing from the tentorium. After the primary uncapping of the lesson by electrial removal of the old disc of overlying cortex and after briting the vascular surface of the epowed tumor with a ball electrode and congulating spray the sketch H shows the primary scallop in process of removal HI shows the condition at the end of the second vestion. The shell of the tumor was finally remo ed at a third see you (Surgical No 3212).

current (Fig 43 II) it was necessary owing to excessive bleeding to keep the raw groove from which each piece of tissue had been looped out clean by suction and to shift from the loop to a ball electrode and from the cutting to the congulating current before the surface could be sufficiently dried safely to permit the removal of the next fragment. Finally, it was found that if the scallop of tissue was allowed to remain in its bed for a time or was hidd in place by the slight pressure of a cotton pledget it could be removed shortly with practically no bleeding.

There is no gainsaving that the employment of the Bovie unit or any other form of

current generator as an aid to the removal of a brain tumor idds a complication to an al ready highly complicated procedure. Let in making a review of the early histories for purposes of this present communication. I find it expressly stitted over and over again that the particular procedure in question though an extremely prolonged and ardiuous performance was one which without the electro surgical adjunct would have been impossible to curry through to a safe conclusion.

During the two years that have elapsed since we hesitatingly began to employ the currents in cramo cerebral surgery five hundred and forty seven operations for tumor have been 784

reformed I hough for some of these opera tion the electrical methods were not essential there were few of them even when no tumor was found in which they could not advantage on ly be employed. The currents are useful even for such trifle as brushing the urface of the dura with the ball electrode in order to eal the torn meningeal veins from which per i tent obzing may sometimes try one s pa tunce or imilarly for checking the per ist ently a zing points on the under surface of the reflected bone before its replacement or for conculating ome retractory vessel on the in ci ed dural margin To be sure muscle im plantation bone way and silver clips have lang been used for these several purposes and they cannot be wholly dispensed with even now but on the whole electrical methods usually serve to accomplish the same ends more expeditiously

Nearly twenty years have passed since Pozzi innounced to the Academy of Medicine in Faris a method for the cure of mahanance by

the action of sparks from the terminal of an Oudin resinator a procedure termed ful guration as Dr Boxie mentions in his intro ductory note Slowly and gradually the original procedure has been modified and extended until for the treatment chiefly of cutaneous lesions and of orificial malignance it has gained enthusiastic advocates. The possibilities of electro desiccation and coa it lation nevertheless have not as yet come to be sufficiently appreciated by the general surgeon who has been prone to regard what are called surgical endothermy or diathermy as merely refined methods of tissue cauterization

Surgery is a conservative art. It takes to novel methods reluctantly as an old do to new tricks It was slow to adopt the ligature slow to adopt the principles of antisepsis slow to adopt the fastidious technique and painstaking hamostasis that have largely put a stop to operating by the clock. It has been equally slow to adopt the principles of electro surgery which from a technical standpoint are likely to be no le s revolutionizin

# A STUDY OF UTERINE AND TUBAL DECIDUAL REACTION IN TUBAL PREGNANCY

BASID ON THE HISTOLOGICAL FAMILIATION OF THE TUBES AND ENDOMETRIA OF TIFTA THEFT CASES OF LETOPIC GLISTATION 1

By MIN R MORITY M.D. von MARION DOUCLASS M.D. CLEVELVOD COMO 1 mih D.p. tm. ( IP th.l.g., d.C., et.l.) fib. M. t. P. C. (y.5 hot.l.f.)

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AN's modern writers have indicated either by implication or direct state, ment that they believe that the development of an extra uterine pregnancy constantly produces a decidual reaction in the uterus which is similar to that associated with a normal pregnancy (Anspach Aschoff Graves Heryheimer Kaufmann Williams and others).

Boehmerus in 175 was the first to observe the formation of decidur in the uterus in a case of extra uterine pregnancy and his find ing was corroborated a few years later by William Hunter That this point soon be came controversial is shown by Parry's re view of the subject of extra uterine pregnancy in 1876. He stated that some investigators believed that decidua is always formed in the uterus others that it is found in the gravid tube while still others have reported the find ing of both uterine and tubal decidua in cases of tubal gestation. Farry concluded that uterine decidua is formed constantly in cases of extra uterine pregnancy and stated the opinion of this astute observer (William Hunter) thus plainly expressed more than a century since may still be accepted as the truth and had others been equally careful in their investigations a great deal of useless discussion would have been avoided apparently ended the controversy that so dis tressed Parry

Strahm in a review of the subject in 1889 wrote that it was then universally admitted that the endometrium undergoes development into true decidua in cases of tubal pregnancy. In his monograph on ectopic pregnancy (19 1) Schumann disposed of this question by the following statement. The influence of an impregnated or imbedded ovium wherever situated always brings about an evolution of

the uterus to some degree with the develop ment of a decidur very in that organ

Dujuet observed that uterine decidua is not always found but pointed out that it is usual for the uterine decidua to be desqua mated during the profuse menses which so commonly occur previous to tubal rupture Novak and Tel inde as well as Schumann explained the absence of uterine decidua at the time of operation by the occurrence of fetal death sufficiently long before operation to permit desquamation of decidua and endo metrial regeneration to occur.

Since the whole matter is still in an unsettled state the study of the uterine curetings and fallopian tubes in a series of cases of tubal pregnancy from the Gyneco logical Service at The Lakeside Hospital was undertaken in order to determine the frequency of the occurrence of uterine and tubal decidua in these cases as well as the frequency of vaginal bleeding and its relation to the state of the chorionic villi endometrium and embryo.

Table I contains the data concerning the 53 cases of tubal pregnancy here reported Histological material for a study of the endo metrium was accessible in all cases but the gravid tubes were not in every instance accessible for complete histological examination since in certain cases only the contents were sectioned. However, all of the cases here reported are of unquestionable tubal pregnance.

Only 8 of the 53 cases showed decided d for mation in the endometrium (I ig 1). The endometrium in 29 instances was in the resting phase while in 10 it showed varying degrees of eyclic hyperplasia.

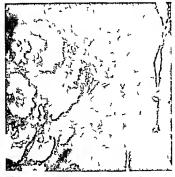
A study of the 45 cases having a non decidual endometrium indicates that in a cer

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tun number of these uterine decidua had never been formed during the cour e of the pre ent pregnancy

In none of the 6 cases shown in Table II was there vaginal bleeding prior to operation

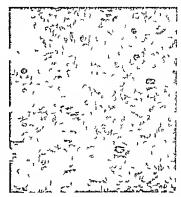
or decidual formation in the uteru If uterine decidua had been formed it should have been found at operation since there was no history of its desquamation Neither was there any endometrial change (Fig 2) that could be



Fi r No 1469 Typical uterine d i lua i dometrium showing Opitz gland of pre, n i n ca e of ectopic pregnancy

construed as involuting decidur or as retained degenerated decidua. We must conclude that uterine decidua had not formed in these 6 cases.

Tubal decidur was found in 26 cases (Table I) We do not mean to imply that tubal decidua was present only in 26 cases because in several instances either a study only of the tubal contents was made or the diagnosis of pregnancy was made on the gross finding of a fetus. In a number of instances an adequate examination of the tube was not made and the study was limited to a few sec tions It is to be noted however that of the 26 cases in which tubal decidua was found endometrial decidua was present in only 5 It is therefore apparent that the development of tubal decidua is far more frequent than the development of utenne decidua in these cases of tubal pregnancy Whatever stimulus regu lates the formation and development of tubal decidua may reasonably be assumed to be responsible likewise for the formation of uter ine decidua. It appears probable that in these I cases utenne decidua had not de veloped (Figs 3 4 and 5) if it had developed it should still have been present. It does not seem logical that the uterine decidua would desquamate and the tubal decidua persist



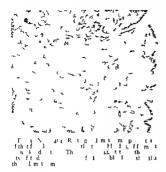
I ig 2 No 17433 Kesting endometrium found in a ca e with o history of va in all bleeding prior to operation lina much as there was no history of bleedin or passage of decidual cast it seems likely that decidua in the uterus had not been formed

There were 4 cases in the series in which the fetus found at operation was in an excel lent state of preservation or was living Their importance is sufficient to justify a brief case presentation

CAST I No 5100 Mrs J colored 30 years of age entered the hospital with a complant of vaginal bleeding and lower abdominal cramps of p vicks duration. Her last menstrual period had been 12 weeks prior to admission. At operation a veil developed approximately 2 month fetur vas frunt attached to the ruptured right tube. The fetur showed no signs of postmortem chang 2 d if n t alive at the time of operation had bend 2 d only a very short period. The uterine curetting? I well preserved intact decidua.

Case 2 No says Mrs B color d spear of age entered the hospital with a comple at of agon i bleeding of a weeks duration Sb 4 mr - fit periods previous to the onset of the operation a 12 centimeter fetus vest and atta by to a recently ruptured right the There valuable for desication to indice the the first had been dead any considerable them. If the curettings showed a resting e for this processing the state of the contenting showed a resting e for this process.

CASE 3 No 14400 Mrs H. cr. 1 31 rage entered the hospital companism the lower abdomen with her base for a month. Her last me, and person to weeks before her admis to the state of the stat



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CASE 4 No 19180 Mr & ht so vars of trdth hosptl mpla gofpain in th h hhd been pes nt fr ab lom p for to adm Vaginal bldghdban ulm st ontinuous dring the p t 8 ton an rpt dlft tufe v h h th r ta t amoi ti icl ont d appar ntl 11 ti milli m ter emb vo ll d l ped ndom tral I idua wa ob d th uterine rett g

Only of the e4 ca es howed a decidual reaction in the uteru. The endometrium of (a es and was in a re ting pha e although in the firta; centimeter and in the second i, contimeter well pre-errod paparently living fetu wilfound. These patients were between, and 4 m onths pregnant at the time of operation but there was no evidence of internie decilial formation.

It is often impossible to say with certainty whether an embry or fetus is alive when seen at operation. It is possible however to tell the difference between a fetus which has been dead for 4 week or more and one that is now it is normal. In each of these 4 call the futus certurily had not been dead as ion as the diuration of the vagarial bleeding. It is



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seen that vaginal bleeding varying from 4 to 12 weeks in duration had occurred prior to operation. Vaginal bleeding therefore does not invariably indicate fetal death.

Table I show that in 46 of the 53 cases there wa a hi tory of vaginal bleeding vary ing from 1 to 1 weeks in duration prior to operation. An attempt was made to establish some connection between the bleeding and either the condition of the endometrium or that of the gravid tube Schumann states that so long as the life and growth of the ovum progresses without interference there is no uterine bleeding and the development of this sign invariably predicates death of the em bryo or at least beginning separation from the fal e decidua into which it has imbedded I olak and Welton concur with Schumann and in their experience uterine bleeding marks the death of the embryo They believe further that as long as a chorionic villus remains alive the bleeding may continue

Because valund bleeding is such a common symptom of eetopic pregnancy and becau e the physiological state of the endometrium a seen in the curettings of 25 of these cases was

### TUBLECULOSIS OF THE GENITAL TRACT1

By HERMAN C BUMPUS JR MD FACS ROCHISTER MINNISOTY
Sec U 1 gy Th U y Cl c

GIRSHOM J THOMPSON MD ROCHESTER MINNI SOTA

If the mode of entry of an infection is unknown and the method of treatment is uncertain interest in the subject is always aroused. Tuberculosis of the genital tract is no exception to this rule as a review of the literature will show

Is the disease primary in the epididymis vesicles or prostate? How often is the urinary tract also involved? Should enididy meetomy be performed? Is removal of the entire semi nal tract preferable to epididy mectomy? It epididy mectomy is performed what are the chances of involvement of the remaining epidid ymis? Can epididymectomy be considered as a curative procedure or only a palliative one? What are the chances of the post operative formation of sinuses? If they occur how long do they persist? What is the life expectancy in these cases? If treatment is not instituted what will be the outcome? What are the determining clinical signs of tuberculous and non tuberculous epididy mitis? These are some of the many questions uppermost in the physician's mind when he encounters a case of tuberculous epididymitis We shall cite from modern literature on these controversial points and add a review of 300 cases which were observed at the Mayo The cases Clinic prior to January 193 occurring within the last 5 years have been excluded in order that the final results might be better determined. One hundred seventy ine of the patients were operated on Two hundred fifty eight were traced. We believe this series is large enough to permit the draw ing of deductions of clinical value

#### DIFFERENTIAL DIAGNOSIS

In a review of this series of cases we noted the listing in the histories of the following intrascrotal lesions

A Traumatic origin (1) humatoma and (1) torsion of the cord with hydrocele

B Infectious origin (1) gonorth ed epidid ymitis and hydrocele (1) non specific epidid ymitis and hydrocele and (3) syphilis of the testis and epididymis

C Tumors of the epididymis (1) angioma (1) hipoma (3) carcinoma (4) fibroma and

(5) dermoid

D Tumors of the spermatic cord (1) lipoma (1) libroma (3) surcoma (4) harmatocele and (5) spermatocele

Tumors of the testicular tunics (1) sar

coma and (2) hbroma

From the foregoing it may be seen that the differential diagnosis in these cases is not

always simple

In the diagnosis of tuberculosis of the genital tract evidence of a tuberculous lesion elsewhere should naturally be looked for in the urinary tract first. If it is found the probabilities are that the thickened epididy mis is tuberculous Stevens who reviewed the cases at Bellevue Hospital stated that if urinary tuberculosis is diagnosed the sus pected lesion in the epididymis will be found to be tuberculous in more than 90 per cent of the cases In 79 of our cases (36 surgical 4, clinical) dysuria was present and in all but 7 renal tuberculosis was demonstrable Bar ney (2) in a study of 154 cases of tuberculous epididy mitts noted tuberculosis of other parts of the body in 55 8 per cent involvement of the lungs being most common 2 7 per cent

In 112 of the 175 surgical cases all verticed by microscopic examination of the removed tissue, there was no sign of tuberculosis other than that of the urogenital tract. In the 63 remaining cases there were o in which there was healed or questionable involvement of the lungs 7 in which pulmonary tuberculosis was active 10 in which there wis tuberculosis of the bones or joints (9 associated with slight pulmonary lesions) and 8 in which there was 15 in pulmonary lesions) and 8 in which there was 15 in pulmonary lesions).

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decidua is constantly found at the implanta tion site if the chorionic villi are intact

3 Vaginal bleeding is a common symptom of ectopic pregnancy and is not necessarily associated with the death of the fetus the condition of the chorionic villi or the physio logical state of the endometrium

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the main arguments relative to treatment however depend on the settling of the point

If the epididymis can be shown to be the initial site of the disease, the simple procedure of epididy meetomy becomes logical. If on the other hand, it is shown that the disease originates in the prostate or seminal vesicles the radical removal of the gental tract with out the testicle would be the accepted procedure.

I hose who believe that the prostate is the initial site of the disease including Walker who has had a great deal of experience in exper imental work point out that when apparently recent tuberculous lesions are found in the epididymis the process is usually far advanced in the prostate and vesicles. They further state that the lesson usually develops in the lower pole of the epididymis where it would be expected that infection by way of the vas deferens would first appear They have noted similar involvement by gonococci which as shown by Rolnick enter through the lumen of the vas deferens. They ask why a different mode of entry should be advocated for the bacilli of tuberculosis If lesions of the cpi didymis are examined microscopically it is found that those in the lower pole seem to be more advanced than those in the upper pole Although the apparent duration of a tuberculous process does not necessarily deter mine its priority lesions of the epididymis have been produced experimentally by the injection of the organisms into the urethra in cases in which the testicle has been injured previously

Young in a most comprehensive article on the subject in which he advocates the ridical removal of the entire seminal tract isserts that the primary focus is not in the prostate or epididy mis but in the seminal vesicles and quotes Gigon the father of modern urology who believed that the tuberculous process usually begins in the seminal vesicles and that the involvement is from urethra outward toward the external gentalia.

Without overlooking the pathological and experimental evidence brought forward by others Braasch (4) Caulk (6) and Barney (2) all emphasize the striking clinical indications that the infection is primary in the



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couldy mis. Caulk says. I have seen any number of prostatic and vesical tuberculous lesions heri-after removal of the external gental tuberculosis. Braasch says. Examination of these patients several years after operation shows that the prostate which was formerly firm and nodular is now much smoother and softer and frequently searcely pulpible. The same is true of the seminal vesicles.

In 5 crees in our series in which a subsequent examination was made some time after epididymectomy the prostate and seminal vesicles appeared to be normal while in 35 others they were nodular but apparently not crusing trouble. We know of only one patient who was not examined who subsequently required operation on the prostate and yesicles.

Barney asks If gental tuberculosis rises in the prostate of even in the seminal vesicle why is it that this disease is practically unknown clinically or postmortem? It is only reasonable to suppose that tuberculous of either of these organs would produce symptoms for which relief would be sought and treatment given. I urthermore prolonged observation of such cases would undoubtedly receil the actual condition sooner or later. If the prostate or seminal vesicle is the starting point of epididymal tuberculosis why is it that the removal of the epididymis has such a



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with a octifed pulmonary leach and r with tuberculo 1 of the uppendix) The addition of the a cic of renal tuberculosis without toci in the lung or other organ give 548 per cent in which tuberculous le ions were i societed The c figure are within a per cent of Barney a timate

If as ociated tuberculou le ions are not demon trable a diagno i of acute tubercu lous enididymiti shoull not be made hur nedly According to Keve when the pon taneous infection of an epichdymi tuberculo 1 ne mu t beware of accepting the suggetion until it lest months have elapsed to prive that the intection will not get well spontane u.h. for unle s there are confirmatory le con el ewhere in the body or real fast bruth can be expressed from the 1 to tate or veicle r ob ained from the urine one inn t be ure that any le ion of the erildymice in pinied by any le ion of the internal genital a actually tuberculous until the lq c i months without spon tineou ure | rive it o

Indicum this int Stevens said Farly ci e (un ler n m nth) of tuberculou and non tuber id u 3 i ii Nemiti have about in equal extent t inv bement of the prostate and we tele. A time clapses these organ in the pre enc. I tuber ulosis continue to give pulpible evil n c of diese in about the ime projection of in traces as is found in the carlier ca where is an simple inflamma ti in they ten I gradually to become normal on palpation Hence marked involvement of the prostate and seminal vesicles after endidy mitis has existed over a month is evidence in favor of tuberculosis after 6 months it becomes a very strong argument for this dia_nosis

The prostate was involved in 52 per cent of cises. It was described as irregular firm and nodular occasionally one had softened area In ca es there were ab cesses

Involvement of the vas deferens was noted by the examining physician in 35 per cent of the cases. It was described as a hard pipestem like thickening with nodulation in proximity

to the epididymis The history of previous epididy mectomy orcludectomy or the incision of scrotal ab scesses has justly been considered a stron cyldence that any lesion of the remaining may indicate gumma Tuberculous sinuse

epididymis is probably tuberculous. The presence of a discharging sinus is almost pathognomonic although in ome instances it are usually posterior while those from gumma are more likely to be anterior. In our series or of the patients had received surgical treat ment previously -58 incision of scrotal ab scesses 6 epididy mectomy and 33 orchidec tomy-and 108 patients had dischargin sinuses (74 surgical and 34 clinical) The sinuses had been draining for from a few days to several years. A tendency was noted in many cases to abscess formation and drainage followed by spontaneous healing then recur rence several months later. In most of the 18 cases in the series of 108 in which the abscess was incised the patients were not aware that the process was tuberculou the remaining 50 case the sinuses formed spontaneously or with no more than the aid of local applications

As the non tuberculous lesions are u ually unilateral the presence of bilateral epididy miti probably favor a tuberculous ori in

#### PPIMARY SEAT OF INFECTION

To answer the question reparding which of the genital or ans will be involved fir t in a tuberculous infection appear to be almost hopeles It is possible that any one of the organs may be initially involved

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If associated tuberculou le ion are not demonstrable a dia_no i of neute tubercu lou epididymitis hould not be made hur riedly According to Keye when the spon taneous intecti n of an emildami ugge t tuberculosis one mu t beware of accepting this suggestion until it let to months have clap ed to preve that the infection will not get well pontine uly ir unless there are confirmatory is upset in the body or icid fast builli can be expressed from the pro tate or vehille it oblained from the urine ne inn t be ure that any lesion of the epilidymi i mi imel by any lesion of the internal cental i a tirally tuberculous until the la t months without spon tineou curcir ve it c

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The prostate was involved in 5 per cent of cases. It was described as irregular firm and nodular occasionally one had softened areas. In cases there were abscesses.

Involvement of the vas deferens was noted by the examining physician in 35 per cent of the case. It was described as a hard pipesten like thickening with nodulation in proximity to the endidymi

The history of previous epididy meetomy orchidectomy or the incision of scrotal ab scusses has justly been considered as strong evidence that any lesion of the remaining epididymis is probably tuberculous presence of a discharging sinus is almost pathognomonic although in some instances it may indicate gumma Tuberculous sinuses are usually posterior while those from gumma are more likely to be anterior. In our eries or of the patients had received surgical treat ment previously—58 incision of scrotal ab scesses 6 epididy mectomy and 33 orchidec tomy-and 108 patients had discharging sinuses (74 surfical and 34 clinical) The sinuses had been draining for from a few days to several years. A tendency was noted in many cases to abscess formation and draina e followed by spontaneous healing then recur rence several months later. In most of the 59 cases in the series of 108 in which the abscess was incised the patients were not aware that the process was tuberculous. In the remaining 50 cases the sinuses formed spontaneously or with no more than the aid of local applications

As the non tuberculous lesions are usually unilateral the pre ence of bilateral epidids mits probably I wors a tuberculous on in

#### I PIMARA SEAT OF INFECTION

lo answer the question re arding which of the gential or ans will be involved first in a tuberculous infection appears to be almost hopele s. It is possible that my one of the organs may be initially involved.

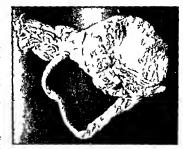
the main arguments relative to treatment however depend on the settling of the point

If the epiddymis can be shown to be the mitral site of the disease the simple procedure of epididymectomy becomes logical. If on the other hand it is shown that the discretoriginates in the prostate or seminal visibles the radical removal of the gental tract with out the testicle would be the accepted procedure.

I hose who believe that the prostate is the imitral site of the disease including Walker who has had a great deal of experience in exper imental work point out that when apparently recent tuberculous lesions are found in the epididymis the process is usually far advanced in the prostate and vesicles I her further state that the lesion usually develops in the lower pole of the endidymis where it would be expected that infection by way of the vas deferens would first appear They have noted similar involvement by gonococci which as shown by Rolnick enter through the lumen of the vas deferens. They ask why a different mode of entry should be advocated for the bacilli of tuberculosis If lesions of the cpi didymis are examined microscopically it is found that those in the lower pole seem to be more advanced than those in the upper pole Although the apparent duration of a tuberculous process does not necessarily deter mine its priority lesions of the epididymis have been produced experimentally by the injection of the organisms into the urethra in cases in which the testicle has been injured previously

Young in a most comprehen ive article on the subject in which he advocates the ridical removal of the entire seminal tract isserts that the primary focus is not in the prostate or epididy mis but in the seminal vesicles and quotes Guyon the father of modern urology who believed that the tuberculous process usually begins in the seminal vesicles and that the involvement is from urethra outward toward the external genitalia

Without overlooking the pathological and experimental evidence brought forward by others Braasch (4) Caulk (6) and Barney (2) all emphasize the striking clinical indications that the infection is primary in the



I g Tuberculo i of the entire et ididymi Tuberculi u no idiation at the jun ture of the vay and the epidid vmi at ding for or 3 contimeter along the vas

couldyms Caulk says I have seen any number of prostatic and vesical tuberculous lesions heal after removal of the external gental tuberculosis. Braasch says Examination of these patients several vears after operation shows that the prostate which was formerly firm and nodular is now much smoother and softer and frequently scarcely pulpible. The same is true of the seminal vesicles.

In 5 crees in our series in which a subsequent examination was made some time after epididy mectomy the prostate and seminal vesicles appeared to be normal while in 35 others they were nodular but apprently not crusing trouble. We know of only one patient who was not examined who subsequently required operation on the prostate and veicles.

Barney asks If gental tuberculosis arises in the prostate or even in the seminal vesicle why is it that this disease is practically unknown clinically or postmortem? It is only reasonable to suppose that tuberculosis of either of these organs would produce symptoms for which relief would be sought and treatment given. I urthermore prolonged observation of such cases would undoubtedly reveal the actual condition sooner or later. If the prostate or seminal vesicle is the starting point of epididymal tuberculosis why is it that the removal of the epididymis has such a

dutiry effect in the other organ of the central tract. There followed a good many (a es for a good many year both before and after operation. While there have been cocasional exceptions as is to be expect ed the prostate and vesicles which were nodular indurated and enlarged before epi didymectomy have eventually returned to in exentially normal condition states that 5 of 6 boys with tuberculous enididymitis who were examined at the Mas achusetts G neral Hospital did not show evidence of the disease in the vesicles or prostate he quotes Kantoronicz as stating that the prostate was involved in only s, children who had epididi mal tuberculo is

Cunningham (b) in a review of 1 250 nec rop y records at the Boston City Hospital found 35 cases of tuberculo is of the epidids mis in which gross and micro copic examina tion of the epididymis and a gross examination of the prostate and vesicles were recorded The vesicles were involved in , ca es and the prostate in 5 He state It is seen that in each instance where the vesicle was involved the prostate was involved also and that there were ten instances where the epididymis was the only structure of the tract affected which gives good rea on for the belief that the disease is usually primary in this organ

In our serie involvement of one seminal vericle was noted in 68 cases in all of which the epididy mis on the same side was affected. In 10 of the c the opposite epididy mis was also involved although the vesicle on that ide felt normal. The e data would suggest that the infection did not travel through the vesicles to the other epididy mis but that it was primary in the epididy mis and the seems to explain the improvement noted following could meetorm.

#### ASSOCIATED URINARY INFECTION

A great deal has appeared in the literature with referen to the incidence of gential tuberculo is as a complication of a unnary infection. Braasch (5) in 1920 made a comprehensive review of a serie of 234 cases of renal tuberculosi and noted that there was genital infection in 171 (73 per cent) there

of urnary tubercul 1 complicating a genital

Barney in a series of 154 cases of tubercu lous epidady mits found associated renal in fection in 45 per cent. In 100 cases of gental tuberculosis. Thomson Walker found accompanying urmart tuberculosis in 37 cases although epidady mitis was present in only 73 of the series.

In our series of 300 cases renal tuberculo is was found to be present in 110 (57 urgical and 53 clinical) and developed after epidi dymectomy in 7 Our observations seem to show at least a 56 per cent chance of the association of renal tuberculosis with tuber culous epididy mitis This percentage is higher than that of other observers but we believe that the recognition of more cases of renal tuberculosis and their surgical treatment explain the lower incidence of late mortality Since in 35 7 per cent of the 109 cases of bilateral involvement and in 37 i per cent of the tot cases of unilateral involvement there was renal infection the chances are that urmary infection would occur whether the epididy mis was involved on one or both sides

In 5, cases in which only one kidney was affected the epididymis on the same in dew affected in 23 ca es on both sides in 21 cases and on the opposite side in 9 cases. Thus in the presence of unitieral disease of the epididymis and coincident renal tuberculo is there appears to be an overwhelming chance that the kidney on the same side is involved. In 22 cases bilateral renal infection was also cated with unilateral epididymal infection.

#### ANALYSIS OF URINE

Micro copic examination of the unine was made in 293 cases and it was negative in 9 Pus cells were found in 137 and in 64 both pus cells and the bacilli of tuberculosis were found Tharty six of the latter were in the surgical group and renal tuberculosis was demonstrated in all but 5 cases. Two of the patients died pre sumably from tuberculosis within 3 years nepbrectomy for tuberculosis within 3 years nepbrectomy for tuberculosis was performed 4 years later on 2 patients and the fifth patient died from cardiac disease. It would seem reasonable to assume that bacilli of

tuberculosis are rarely found in the urine in cases of tuberculous epididy mitis unless there is also tuberculosis of the kidney Cunning ham states that in many clinical cases in which the vesicles and prostate were typically tuber culous smears of the expressed material show bacilly of tuberculosis in less than is per cent of cases examined In this connection it may be noted that of the 70 cases in which there was dysuma renal tuberculosis was demonstrable in all but 7 and postopera tively only 3 patients aside from the 79 mentioned complained of this symptom when Dysum therefore does not appear to be a symptom of genital tubercu losis unless there is coincident renal involve ment In reporting one of the few cases of primary tuberculosis of the prostate discov vered at necropsy Koll states that there were no unnary symptoms prior to death Dysuria therefore must be considered as an important indication of renal involvement

#### INVOLVEMENT OF THE REMAINING EPIDIDAMIS

Thomson Walker states that if the epididymis on one side is tuberculous the one on the other side is invariably affected after a year or two. In Stevens, series of 74 proved cases 25 per cent involvement of the epidid ymis on both sides was noted on examination and in the series reported from the Massa chusetts. General Hospital Barney noted involvement of both sides in 29,3 per cent.

In 100 of our cases approximately one third bilateral involvement was noted on examination and involvement of the remain ing epididy mis was noted in 38 cases the other having been previously removed presumably because of tuberculous infection Bearing in mind these percentages of bilateral involve ment at the time of the first examination it is of interest to note the incidence of recur rence in the remaining epididymis following surgical procedures Keyes says operation ever so slight or ever so radical relapse on the other side almost inevitably occurs Barney says My figures show that relapse is less apt to occur if the first epidid ymis is operated on Barney reports only 10 6 per cent of such recurrences in his series of cases



Lig. 3 Tuberculo 1 of the testicle and epididymis. The testile and epididymis have been split to show the miliary involvement of the testicle and caseation of the epididymis.

In our series of 175 surgical cases bilateral involvement occurred in 58 orchidectomy or epididymectomy had been performed on the opposite side in 26 there was one case of atrophied testicle following mumps and one of an undescended testicle thus there were only 80 cases in which it was possible for the tuberculous process to extend to the other side Eighty of these we have traced o of the patients have died and of the 71 still living 28 (30 per cent) have tuberculosis in the remaining epididymis. It would seem that epididy mectomy did not tend to lessen the involvement of the remaining epididymis and yet the fact that in 82 per cent of the cases it became involved within a year after operation indicates the possibility that it was microscopically involved at the time of oper ation and that the operation was responsi ble for the low incidence of extension later since during the second year only 65 per cent were involved and in from 2 to 10 years only to per cent after this time involve ment was infrequent single cases occurring ı ıs and ız vears later

#### SINUS FORMATION

Whether or not the operation prevents extension to the remaining epididymis it may remove or prevent a distressing discharging sinus and frequently relieves the patient of a painful focus of disease. Unless surgical

procedure is in tituted for the relief or prevention of suppuration it is que tionable, whether it is indicated. It must if cour is be followed occasionally is in ill tuberculou proce e by the development of the charging muse, it is chief object being to prevent the

In the 175 surgical cales the wound healed within a month in , cases and during the first year in 15 more in 8 case a sinus persist ed for years and in for 7 years Several of the patient in replying to our questionnaire v lunteered the information that healing did n t commence until they exposed them selves to sunlight following which healing was rapid. Myle has shown conclusively in the care of veterans that hehotherapy causes rapid healing of scrotal sinuses and causes the regression of all tuberculous lesions of the cenital tract. He states that the foundation of the treatment is based on the assumption that tuberculo 1 of the genital tract is a local manifestation of a generalized process and that treatment in order to be curative ind permanent must be directed toward the di ease as a whole rather than toward local manifestations alone. He therefore contines the patient to bed for veus and administers heliotherapy duly Few patients suffering from tuberculosis of the genital tract could be persuaded or have the means to undertake such an ideal cour e of treatment neverthe less whenever possible liehotherapy hould be used in a sociation with surgical proce dures If the di ease 1 not far advanced heliotherapy may be supstituted for surgery if it is available to the patient economically and cographically where it is not the arti ficial sunlight of the quartz lamp may be ubstituted One of our patients reported that he into hid not held noted be had had such treatment although he had tried helio therapy previously

#### IRFAIMLNY

Young behaving the eminal vesicle to he the primary point of infection advocates the removal through a perineal incision of both cimial vesicles and ampulte together with the prostate at the same time removing the vis deferens and diseased epididy mis through an incimial incision. The operation is radical

and Ounby is the only one of the leading urologisty who have felt that the disease damands this drastic form of treatment. He reports 6 cases in which he removed the enunal vesicles the procedure did not how ever always prevent the later development of the disease in the remaining epiddisms and in several cases a persistent pennel sinus developed. Young has reported 15 cases with a death at the time of operation.

Vine of our patients were treated by this radical procedure 4 of them are dead 4 are living and a case has not been traced. The c results are not better than those of the more conservative method of removing the epidid ymis with a portion of the vas deferens a procedure preferred by most surgeons because of the lessened risk and the equally good final results. Hunt says. Even though most patients with tuberculosis of the epididymis have one or more scrotal sinuses, the hi h inguinal incision is preferable to the scrotal incision The contents of the scrotum are readily drawn up into the incision thus facili tating excision of the epididy mis the involved tunica vaginalis and sinus together with the was as high as the internal inguinal ring Primary healing of the wound is the rule Excision of the involved and inflammatory tunica vaginalis is important for early dosure of the scrotal sinuses. While castration is sometimes necessary in cases of extensive involvement resection of the testicle is readily accomplished in cases of partial involvement The frequency of bilateral tuberculosis of the epididymis should condone the promiscuous orchidectomy for either unilateral or bilateral involvement if for no other rea on than for its mental and physical effects

Mavener followed this method in a ene of veteruns under government care. He injected the perineal end of the vas deferens with phenol and closed the wounds without drainage. He says. Sinus formation is en couraged by drainage and most of these wounds closed primarily and healed like incisions for herma. Two cales with involvement of the eminal vesides presenting indurations and swelling to the size of a small orange on rectal examination improved at once after epiddy meetomy and the pelvic

mass decreased one half in size within a few weeks

The possibility of exciting militry or meningeal tuberculosis following epididymec tomy must not be overlooked. Crulk reported

cases in which meningitis developed after simple epididy mectomy under local an esthe sin and called attention to the increase in virulence of tumors and infections of the testicle as compared with similar lesions in other parts of the genito unnary tract our series there was one death from tuber culous meningitis and one from miliary tuberculosis following operation It seems in advisable therefore to operate until the con dition has become chronic in order to minimize this risk

#### I ROGNOSIS

The late mortality following either single or double epididymectomy is variously esti mated Berger reported on 46 cases traced from 1 to 25 years Thirteen patients ( 9 per cent) had died Cunningh im reported on a series of 32 cases Seven patients (21 per cent) had died within 10 years Barney traced 113 cases from 1 to 25 years after operation and found that 7 per cent of the patients had died from some form of tuber culosis He estimated that 85 per cent of deaths occur within the first 6 years Young warns against forgetting that many patients from whom replies are not received are dead and that if cures only were included in the estimates of prognosis the percentage would be 19 per cent Braasch in discussing I oung s report calls attention to his review of 34 male patients on whom nephrectomy was performed at the Mayo Chaic 171 (73 per cent) of whom had tuberculosis of the genital tract also He says Twenty six putients (18 per cent) were reported dead which is somewhat less than the average mortality of 24 per cent for all patients Although there was definite involvement of the prostate and seminal vesicles in all of these cases 80 per cent recovered after nephrectomy It seems questionable whether these percentages could be improved by removing the prostate and vesicles

Of the series of 175 patients treated sur gically 85 (485 per cent) are known to be

alive for from 5 to 17 years after operation 13 others were in good health when heard from during the spear period but did not answer the questionnaires As these were not returned from the postoffice the probability is that they were received and not answered in this event 56 per cent of patients are alive more than 5 years Fighteen patients (10 per cent) died from tuberculosis of the urinary tract nephrectomy had been performed in 16 of these at the time of their examination Seven of the 99 patients who were free from renal tuberculosis at the time of operation later contracted the disease | Tifteen patients (5 6 per cent) died from pulmonary tubercu losis in every case its presence was known at the time of operation but was not considered f ir enough advanced to be a contra indication I our patients (2 2 per cent) died from other torms of tuberculosis making a total of I per cent of cases in which death was attrib uted to tuberculosis. Seventeen patients (o > per cent) died from unknown causes I ourteen cases (8 per cent) were not traced and o patients (5 3 per cent) died from various unrelated diseases

If we consider that all patients not heard from have died from tuberculosis and exclude the q who died from other causes there is or a per cent of good late results which as we have said may be attributed to the large percentage of cases of renal tuberculosis dis covered at the time of examination and the prompt surgical treatment. This seems to be further emphasized by the low incidence of later deaths 10 per cent from renal tuber culosis and the fact that in 56 of the surgical cases nephrectomy was performed in 10 prior to operation on the epididymis in 38 at the time of examination and in 8 subsequently In proportion as these cases of renal tubercu losis were overlooked it is apparent that the late mortality would have been increased Of the 8 cases in which nephrectomy was per formed after the patients left the clinic the bacillus of tuberculosis was found in the urine in 3 at the time of examination but operation was delayed in a the urine was infected but there were no acid fast bacilli and in ? urinalysis was negative. All the patients are alive and well. In 2 other cases in which

there were acid for to organisms in the unue and nephrectomy was not performed the patients have died from renal tuberculosis. This emphasizes the importance of a careful microscopic evanination of the stained uninary ediment. Neglect of this measure will we believe affect the final mortality rate in cases of tuberculosis of the gential tract sin eithere are so few cases in which the bacilli are found in the unine without renal involvement.

#### NON SURGICAL CASE

A comparison of the results obtained following operation was made with the course of the 1 5 non surgical cases Forty two patients (, per cent) not operated on are alive from 5 to 17 years after examination only 7 of these have found operation necessary the e returned to the Mayo Chric for epidid vmectomy Epididymectomy was performed on one elsewhere and orchidectomy on 3 The other patient decided to resort to more radical measures and the entire seminal tract was removed. He is still alive but 13 subsequent operations have been performed on the genito urinary tract. The remaining as patients reported that they are cured 5 of these were troubled for a time with dis charging sinuses all of which have healed without surgical intervention Of the un treated patients 30 per cent died subsequently from some form of tuberculosis This inci dence is one third greater than in the surgical group and might be used as an argument in favor of surgery except that the group is composed of many cases in which because of advanced tuberculous lesions elsewhere sur pery wa not advised as well as many cases in which it did not seem wise to operate because of the slight involvement of the epi Forty of our patients had atrophy of the testicle following operation and .o did not so we believe a 4 to 3 chance that the te ticle will atrophy following epididymec tomy mu t be carefully con idered Since in addition there appears a 39 per cent possibility of extension to the other side with the necessity of a second epididymectomy the possibility of bilateral atrophy would seem a erious contra indication to surgery If

suppuration and annovati path or we ha are absent and heliotherapy is available operation should not be urged Operation seems to affect sexual efficiency only slightly 15 7 patients complained of diminution and all were asked specifically concerning it Fertility of cour e is greatly affected al though the belief that bilateral enididumitis means tenhty does not always hold One patient who was advised to have double epididy mectomy refused and later became the father of 2 children In the surgical group 6 patients on whom unilateral epididy mectomy was performed have had children and camon the non surgical cases report offspring al though disease of the prostates of 8 of the e ir was sufficient to be evident on palpa tion The greater number of the patients are of course sterile

#### CONCLUSIONS

We believe this study shows that

I Dysuria is a symptom of urinary tuber culosis and does not occur when the disease is confined to the genital tra t

2 The presence of the bacilli of tubercu losis in the urine indicates renal involvement

3 Unless the urine is microscopically negative cystoscopic examination should be made in all cases of chronic tuberculous endedy mitis

4 Satisfactory late results may be expected

in more than 60 per cent of cases
5 It may be expected that epidid mec

tomy will be followed by involvement of the opposite epididymis in 39 per cent of cases 6 Usually involvement of the opposite side will occur within one year of the epididy

7 There is a 7 per cent chance of the development of renal tuberculosis after opera

tion and 8 Conservative treatment epididymec tomy and heliotherapy offers a better prog nosis than more radical measures

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# THE TEMOVAL OF STONES FROM THE COMMON AND HELVIED BUT DUCTS IN TAUNDICED LATERNES!

B WWINN WELLIKS ND INGS K

THE complete removal of a stone or tone from the common bik and he patic ducts that are producing bihars bstru tion is followed by excellent results in a lugh percentage of cales. The duration and degree of jaundice resulting from the cb truction apparently does not compromise the rive ult In ome in tances diseases of the extrahepatic biliary pas ages with infec tion in the gall bladder and stones in the common and henatic bile ducts usually producing obstructive jaundice have been accoma mied by pre operative complications such as ubdiaphrigmatic ab cess perforation of the nosterior wall of the gall bladder into the sub tance of the liver cirrhosis of the liver with a cite and plenome, alia and in one case h emolytic raundice. Measured by the pa tient's feeling of well being and relief of pain the results of operation in such cases have been is satisfactory as in the cases of common duct tones without such complication

Descriptions of urgical technique are in tere ting but to be valuable they hould pre ent evidence to show by the number of cases a well as by the results obtained whether such technique will tand the test of

compart on In a group of 6, case of obstructive lesions t the comm n and hepatic bile ducts on which I operated during the last 3 / years it wa nece art in 40 cases to remove one or more stones from the common or hepatic bile A period of more than years has elap ed ince 1 of the e operations and in 10 the re ult have been excellent ther cales the patients have gained in weight and have been free of pain but have had tran ient light jaundice on one or two occa ions Eight patients were operated on from 1 to 4 month ago all have had excellent re ults Less than 12 months have elapsed ince 16 pitient were operated on and all of them up to the present time have been free of turther trouble Four of the 40 patients died following operation. One of these was an intensely jaundiced patient with a van den Berth reaction of 20 milligrams for each 100 cubic centimeters Failing renal and hepatic function was evidenced by deepening jaundice increasing coagulation time of blood and blood urea of 70 milligrams Operation for the relief of the obstruction due to multiple common and hepatic duct stones was per formed with the hope that death mi ht be prevented. The patient died however on the fourth postoperative day. At necrop y throm bosis of the portal vein was found. Two patients deeply jaundiced at the time of oper ation with serum bilirubin of 1 5 and 12 milligrams died late in the postoperative course Necropsy revealed that one patient had bronchopneumonia only the common and hepatic ducts had been completely freed of stones \ccropsy was refused in the other case The fourth patient died of pentoniti

Strictures of the common or hepatic ducts were the cause of the ob tructure a nunder an andditional r6 pritients operated on 14 of whom are hiving free of Jaundice and quite well. One of the deaths in the c ac of stricture occurred in the hospital subsequent to operation. The other patient who died was a woman of 64 on whom an anistomo is of the hepaticoduodenostomy type was performed with only a fining-of normal duct remaining for the mastomo is to the duodenium. She returned home in good condition 3t weeks after the operation. Twelve month later she died at home of unknown cruse. necrop vias not obtained.

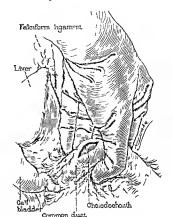
There were 11 putents with lesion in the head of the pancreas producing obstruction of the pancreatic portion of the common bile duct on whom cholecy stogastrostomy cholecy stoduodenostomy or choledochodu deno tomy was performed 6 are hving comfortably working and free from jaundice and itching More than 2 ½ years have elap ed since oper attonion one of the patients of this group. He

has gained in weight has been free of jaundice and itching and his worked since the opera tion One patient hyed for 20 months subse quent to relief of jaundice and itching by anas tomosis between the obstructed biliary tract and the stomach Necropsy by his home phy i arn showed pancreatitis with bihary cirrhosis Another patient a managed 57 had a pre oper itive seriim bilirubin of 15 milligrams. I ollow ing a cholecystogastrostomy for the relief of biliary obstruction due to a tumor 7 centi meters in diameter in the head of the pan creas he was allowed to return home 4 weeks after operation. For 9 months, he was free of jaundice and itching gained in weight and was able to work. He died a month later to months after operation

#### PEPIOD OF LIFPALATION

Following the work of Hallenbeck and Giffin who began the preparation of jaundiced patients for operation by the oral administra tion of calcium lactate and when necessary blood transfusion Bell and I after a chinical study carried out in 19 1 advised the use of intravenous injections of calcium chloride to prevent postoperative bleeding. Later the toxicity following the intravenous injection of calcium chloride in animals was studied and the amount necessary to reduce the coagula tion time of most joundiced patients (5 cubic centimeters of a 10 per cent solution daily for 3 days) was found to be a fortieth of the lethal dose for animals measured by grams for each kilogram of body weight. I rom the experimental data of Opic Mann and others on the value of carbohy drate over any other type of food if the liver has been injured and function impaired it was decided that a high carbohydrate diet and a fluid intake of 3 000 to 4 000 cubic centimeters in each 24 hours should supplement the intravenous injections of calcium chloride in the preparation of joundiced patients for operation. Since that time reports in the literature indicate that this method of preparation has been generally and succe stully adopted (1 , 4 7 11 13 14)

In 19.5 Sech, suggested that the calcium chloride be given in 1.5 cubic centimeters of phy iological solution of sodium chloride to prevent localized thrombosis at the site of



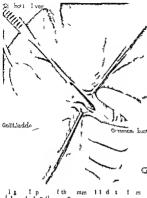
1: I ation of a stone in the common duct. The duct i opered by mean of a cut made directly down on the tone.

injection and sloughing of the skin if the needle does not reach the vein. This sugges tion was adopted

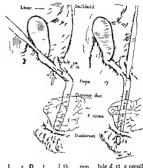
McVicar has suggested that reperted deter minations be mide by the van den Bergh test of the amount of bile pi_ment in the blood stream and that the presence or ibsence of the flow of bile into the intestines be determined by duodenial drainage during the period of preparation. The propitions time for operation is when the bile pigment in the blood stream reaches a level particularly if the bili rubin emin is decreasing. In a few cases under observation and preparation the bile pigment in the blood stream will increase and should it increase progressively the additional risk of delay should be carefully weighed against the prognous

## INTES OF STONES IN THE COMMON BILL DUCT AND TECHNIQUE OF REMOVAL

In seneral stones in the common bife duct my be small and multiple and floating in the bile in the common and hepatic ducts. They my be single and floating in the bile in the



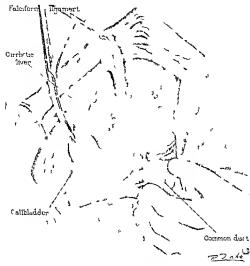
ampulla of Vater (ball valve stones of Tenger) or they may be large (from 1 to meter in diameter) and impacted in the common bile duct below the entrance of the cystic duct Obesity adhe ions from previous oper ations or the massing of tissue from diffu e inflammation in some cases make exposure of the common bile duct difficult. An exceed ingly difficult and serious operation can often be made simple and safe if the stone in the common bile duct is located by palpation and it we work from the outer not ide of the abdomen toward the duct at a depth of approximately that of the common bile duct rather than directly down on the duct. By grasping the duct and fixing the stone be tween the thumb and fingers of the left hand we can open the duct and remove the stone by cutting directly down on it (Fig. 1) I have employed this method in 10 serious cases of biliary ob truction and the rapid uneventful recovery of the patients leaves no doubt as to the advantage as well as the nece its of relieving the cause of biliary obstruction with as little manipulation of adjacent structures



bile d ct c pecially zo timiro t

and to sues as possible. As the edges of the duct separate they are grasped with Alli After the removal of the stone and the fixation of the opening in the duct by forceps scoops can be introduced easily into the common and hepatic ducts and through the common duct into the duodenum thus removing other stone if present and what is mo t important making certain that the continuity between the liver and inte tine through the extrahepatic biliary tree i defi nutch estable hed (Fig. and 3)

When stones are present in the gall bladder also particularly if they are small their re mos al before the common duct a opened will prevent the possibility of their bein, dumped into the common and hepatic ducts durin exploration of the latter. It should be re membered that it is usually safer from the standpoint of the patient's recovery to drain the gall bladder in case of jaundice than it i to take the increased risk of cholecy tectomy Should one cleet to drun the gall bladder rither than remove it it interior hould be circfully pulpited with the tinger to climinate the po ibility that any stone remain e [c cially in the cystic duct. In cases in which stones were removed from the gall bladder



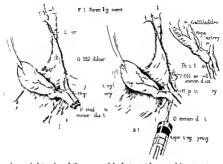
It 4 Proposure of the common bile duct

and cholecystostomy was performed after the removal of stones from the common bile duct the patients have done as well as those on whom cholecystectomy was performed

In the absence of ordema and infiltration from acute cholecy stitis exposure of the com mon duct is comparatively easy. The gall bladder is grasped with a curved hamostat and gentle traction is made on it toward the patient s right shoulder Two gauze sponges are inserted to hold back the colon and stom ach and with a third sponse the hepatico duodenal ligament is straddled by the first and second fingers of the first assistant s left hand while he tracts downward and to the left on the hepaticoduodenal ligament such manner it is possible to expose the com mon bile duct so that it may be opened under direct vision (Fig 4) Forceps are then in troduced and the stones removed. In such cases the ease of the operation is dependent

on the excellence of exposure of the common bile duct. After the stones are removed from the common or hepatic ducts with scoops or forceps if the size permits it is always best to explore the interior with the finger. By using the finger as a probe one can be most certain that the interior of the duct is clear this is not possible however in many cases because the duct has not dilated sufficiently.

In a recent case following the removal of a large stone from the common bile duct sufficient dilatation of the ducts made it possible to introduce a finger and carefully palpate the intended of the common duct we found the sphincter of Viter dilated and partially opened to a diameter of approximately a centimeter. The notation of this at the time of operation led to the elimination of the fourth day following operation when the amount of drain



lilt hpfth mm bldet potle diepst try

Ige from the Mayo Pobson hepatic drain which had been placed through the common bile duct a rie firm 900 to 3800 cubic centimeters eith 4 hours during, a period of 7 days Obyl ulv we were dealing with a re iliux of duoden il entents through the dilated papilla into the large common bile duct and net with 1 fill us tract between the wall of the duidenium and the exterior of the body. This reflux of duidenil secretion ceased abruptly when the Mayo I obson hepaticus druin was rein ved the wound healed rapidly and the patient made an excellent recovery.

The most clu ive stone is a small one float in the life f the ampulla which cannot be palpated because of its size and the sur rounding pan reatic tissue. In such cases repeated colic followed by raundice or the intermittent hepatic fever of Charcot neces state exploration of the common bile duct The introduction of a scoop into the lower portion of the luct 1 rewarded often by the return f the t ne in the scoop In a few cases in which the time is not returned by the exploring coop manipulation through the lower portion f the common bile duct may thrust the small stone through the papilla into the duodenum and its exit occurs through the inte tinal tract

## SECONDARY OPERATIONS ON THE COMMON

In cases in which operation has been per formed on the biliary has ales the connective tissue around the structures in the hepatico duodenal ligament may effectively cloak them or disturb their position so that it is difficult to identify the common bile duct. Under such circumstance of the common bile duct is scarred regardless of whether this is due to infection or trauma what would seem to be dilated common bile duct may be the portal vein. An aspirating needle and syringe as recommended by Derver can best be used in the identification of the common bile duct or its stump (I ig 5) Should the portal vein be punctured the bleeding can be readily con trolled by the application of pre- ure to the needle hole for a few moments. On one or two occasions what seemed most certain to be the distended duct proved to be the portal vein but no harm was done by the puncturing needle Many such secondary operations are exceedingly difficult and the utmo t care must be taken in the dis ection of inte tines from the under surface of the liver in order not to open them inadvertently When the common bile duct is intact it will always be found to occupy the most lateral portion of the hepati

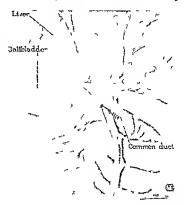
coduodenal ligament and it is best to approach from that side and keep close to and work down on the under surface of the liver. In such cases the discovery by palpition of i stone which is large enough to be grasped in the fingers gives a feeling of attraction because it means certain i olation and identification of the duct

Following exploration of the interior of the common bile duct a eatheter of sufficient cali ber to drain bile from the biliary tract tem porarily is sutured into the duct. Such a catheter is removed between the tenth and the twelfth postoperative day (I ig 6) I tube is hest it prolonged drainage of the biliary tract is desired

#### THE PEPIOD OF CONVALENCENCE

If the biliary passages are cleared of stone and ready exit of bile into the intestinal tract or to the exterior is provided during the period of acute inflammatory a dema follow ing operation on the ducts and their contigu ous structures convalescence is practically always without incident. If free pas ago of bile is not provided the jaundice may deepen the coagulation time may lengthen and bleed ing from the wound occur. Later if the obstruction is not relieved the train of events leads through hepatic and renal insufficiency to death

Should a stone remain in the duct or should pancreatitis and cedema of the pancreatic portion of the common bile duct prevent the passage of bile into the intestinal tract and bleeding occur from the wound every effort should be made to attract more drainage of bile to the exterior hence the necessity of temporary drainage of the common bile duet in all cases following the removal of stones Should bleeding occur from the wound it may be checked by the intravenous injection of calcium chloride or transfusion of citrated blood provided the jaundice is not increas ing from continuing obstruction. In one ease in which such measures failed the wound was opened and the bleeding from the hepatic notch controlled by the application of a pick of iodoform gauze mixed with powder composed of 8 parts of powdered boric acid and 1 part powdered acetanilid



Fi 6 Drains c of the heratic duct by Mayo Robson lepati ii drain

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# THE PATHOLOGY OF EPIDIDYMITIST

By HARRA C ROLNICK MD Ca co

THI pathology of epididy mits his been studied rurly extensively both abroad and in the Linted Strites. Cunningham and Gook (1) and Kretschmer and Mexander (2) have within recent vears pre ented studies of the pathology of acute and chromic epididy mits in a large eries of ca e together with a rume of the literature. Very little study has however been mide of the pathology of acute epididy mits during the hist few days alter onset and practically none of the mode or path of extension of the infection in the epididy mits during the hist few days alter onset and practically none of the mode or path of extension of the infection in the epididy mis

The experiments to be reported in this paper were undertaken in order to determine the pathological changes in early acute epi didymits and also the route taken by the bacteria in the extension of the infection up ward in the epididymis. In 19.4 the writer presented before the Chicago Urological Society, a theory of the mechanism and pathology of epididymit. (1) that correspond well with many of the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects after the corresponding to the clinical facts and some experimental objects and the clinical facts and some experimental objects.

The invibility to inject fluids through the sas deferens beyond the tail of the epididymis (Fig. 1) of experimental vinimals and also that of the living human is a factor which apparently had not been previously considered. The deductions made from this finding were that bacteria from the infected seminal vertice traveling along the lumen of the vas deferens in the development of epididymits are prevented from passing upward along the lumen of the epididymits are prevented from passing upward along the lumen of the epididymits are prevented from passing upward along the lumen of the epididymits of the properties of t

The tail of the epididy mis suffers the brunt of the inflammatory process but the body

and head of the epididymis and the other contents of the scrotum are also affected It was therefore assumed that the infection in epididymitis secondary to seminaly esicular is intra tubular in the tail of the epididymis that it involves the rest of the epididymis by pen tubular and interstitul extension and produces a pen epididymitis of the body and head rather than an epididymitis.

Belifeld and I olinick () have recently demonstrated excretion by the body of the epidigms (fig. 3). Although we are not concerned here with hemato_enous infection of the epididy mit this finding of excretion would indicate that many of the cases of chronic simple epididy mits and many other types of epididy mits are of hematogenous ori, in none of the ections made in this sense of experiments secretion by the epididy mis a well recognized function is also demonstrated

The results of the experiments verify only in part the theory of the pythology and mech anism of epiddy mits is just strated. This work which is now presented was done durin. July and August 19.5 and has not been previously reported. I eport can be given of a series of experiments on 18 dogs and 4 chinical ca es of acute epididy mits which have been studied since then.

The experiments were divided into, group In all cross the epidid mides were injected by laterally through a visotomy incision with either chemicals or buttern or both. The aminals were de troy ed it intervals of from 1 to 8 days following the injection of chemical and it intervals of from 36 bour to 6 day following the injection of buttern. In those in which the injection of buttern was followed.

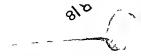


Fig 1 \ \text{roentgeno}_{eram} \text{ taken following 1 le injection of the epididymix of a dog through the as deferen with oper cent sodium iodide solution and hoving the imposibility of forcing fluid be ond the tail of the epil 1 km.

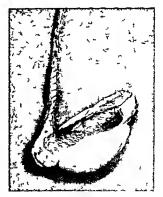
within a few hours by the injection of chemicals the intervals between operation and destruction or death of the animal varied from 3 to 6 days. Sections were then mide of various parts of the full body, and head of each epiddy mis—164 sections in all

The 7 dogs in the first series were injected through the vas toward the epididymis with various chemical solutions consisting of a per cent protargol, and 5 per cent collargol 1 per cent mercurochrome and I per cent chlorazine The results of these experiments corroborated the work of Belfield carried out many years ago in which he showed that it was impossible to produce a chemical epidid ymitis Since the e experiments were con ducted experimental work by us on the living human has also agreed with these observations of the failure to produce a chemical epididy mitis None of the solutions could be found in sections of the body or head and were pres ent in the lumen of the tail only. The epithe hum of the tubule remained intact even with 1 5 per cent collargol solution and none of the solutions could be found in the interstitual tissue They all remained within the lumen of the tail of the epididymis

The 7 dogs in the second series were in jected in the same manner with britteria and as previously stated sections were made of various parts of the epididy mides of the dogs who were destroyed at intervils of from 36 hours to 6 days following injection. The bacteria were 24 hour growths of stock cultures of bacillus coli staphylococcus aureus nat staphylococcus aureus hamolyticus the virulence of which had been previously determined. The staphylococcus aureus hamolyticus had been fatal to a hospital internet a years previously. The bacillus coli was



lig 2. There seminal duct from tail of epididym to pro tatic urethra injected in the living will jodged oil though va olony. Not even a vatery that could be forced levon the tail of the epididym. Note large loop in pel ic portion of the vas. The large shadow above the extest due to urplu oil in the bladdow above the



Is 3 The lel and I divni fad Silver rephenamene his ben injected into it nillel ly fite epididym slow the prence of alt the lead and tail do not



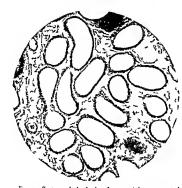
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on iderably le virulent than the other types The mier copie pathology did not vary with the different organism except in intensity of infection Nearly all writers

agree that the pathology of epididymitis in the human varies but little with the different infecting organisms

The gross pathology found corre ponded with that reported by the authors previously mentioned except that the infections due to the staphylococcu aureus hamolyticus were more severe and de tructive than that usually seen Multiple ab cesses particularly in the tail and some in the body and head were A thermon and purplent evudate covered the tunica in some and the testicle was also involved in a few cases

The microscopic pathology brought out one finding quite distinctly that i that the m flummation e en in the tail of the epiditymis is not intratubular but is peritulalir and inter still il (Fig 5) It also demonstrated as had been suspected that the involvement in the head and body was interstitud and not intratubular (Fig. () 1hi latter had been dem on trited by Andrey and Dalous in 1903 (1) who showed that the extenion of the infer tion in the epichdymi was vir the inter titral tissue and lymphatics. Although the wall of the tubule in the tall showed considerable cedem in some cases and although the tubule

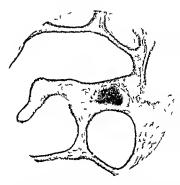


It ? Section of the body of an ejald him anje ted through the vast deferen 4 day previou by vith a 24 hour culture of tripl vlococcus aureus. An inter tital at c and round infiltration are shown. There is no intratubular 1 olvement.

was often markedly compressed and orde matous the epithelium was apparently intact In a few instances there was some leucocytic infiltration in the lumen but here also the epithelium showed very little change. Where large abscesses had formed these were inter stitial and had pushed the tubule aside and compressed it. In some cases the tubule was involved and destroyed. In others there was marked round cell infiltration around the wall of the tubule and in some within the wall associated with an ordemy of the submucosy and occlusion of the lumen as result of this cedema In most of the sections areas of round cell infiltration or abscesses were to be seen only in the interstitial tissue (Fig. 7)

The tubule of the body and head wis usually somewhat dilated and in others markedly so (Fig. 8) with areas of round cell infil tration or abscesses in the interstitial tissue only. In some sections of the tail near large abscesses the tubule was also distinctly dilated. The tubule above the tail was in some cases filled with sperm. In most instances however no sperm was found.

Nobl (6) and Seller (8) showed that in both acute and chronic epididy mitis there is a



Its 8 Marked d latat on of the tubule above the tri vith an inter titud at e but no intratulular involve ment Section of the body of the epididym which lat be a injecte latif lacillus colisticough the yas defend days previous by

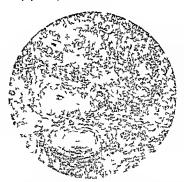


Fig. 9. Section of the t. 1 (f. n. cp. didx m: injected with a 4 lour culture of t. phylococcu aureus. I just in hour later 2 per cent mcreurochrome was inject. I through the an inthe same mar nor to rat the epil. I yn nd the animal as dest oved 4 day follo vin, the injection of the bacteria. Not the marked round (ell) niftic tion interstitual indiger tubular but not intri tul ular. I have been van the humen of the tul ular the type how an in the humen of the tul ular the type the van the humen of the tul ular the properties. The same price which did not cap out i le a did the bactera had no effect on the inf ction.



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marked increased connective it sue about the tubule. In chronic epidedy mits Delbert and Chevassu (4) showed that teno is is due to contriction of newly formed connective tissue and epithelial proliferation within the tubule Walft (9) showed the pentubular sheath markedly dirupted in acute epidedy mits

The third serie of experiments consisted of the injection of the 3 cultures into 4 dogs. I his was followed within from 1 to 18 hours by the injection of 1 per cent mercurochrome through the vallewing to the epididymis in the ame minner in which the bucteria had be nintected. An attempt will made here to medicate the epididymi directly and possibly about the epididymit.

The ro's ind micro cipic pathology was not litterent with the injection of both bric teria in t them it than in those in which bettern inly had been injected. The multiple absect and round cell inflittation per tubular and interstitud were similar to the et in which only batteria had been injected. The tubules of the tail only showed mercuro chrome in the lumen none was found in the peritubular or inter titual tissue.

The last series of experiments reinled the previous findings that the primary cat of the inflammation is around and between the tubules and not in the lumen and that direct medication of the pudidy mis through the vas is therefore of ne value.

The last experiments also demonstrate that within a few hours after the bacteria reach the epididy mis they penetrate the wall of the tubule by pas ing between the epithelial cells and rapidly spread to the inter t tial tissue. The 4 sections of clinical cases of acute epidid runte 3 5 7 and to days after on et al. o howed marked interstitual involvement of the tall but practically no intritubular involvement. In the case of to days, duration the e was marked epithelial proliferation in parts of the tubule and de truction in a few areas.

This interesting observation that epididismits in its onset at the tail and in its extension upward is almost entirely a peritubular and interstitial inflammation and not intratubular is of considerable clinical importance. Although these findings do not corre pord with many of the descriptions of the pathology made by others who reported considera

ble intritubular involvement, the mo i bleds explanation of their finding is that in most instances the pathology of neutropaid yields was studied in infection, that had been present to days or more and therefore after destructive changes in the abbilit had taken place as the result of compression or abscess or extension from without

#### SHMMADV

I It is not possible to produce a chemical epididymut. This has been demonstrated clinically in that epiddymuts does not follow a stoomy except in those cases in which there has been a secondary infection of the a wotomy wound.

Acute cpididymitis at its onset copy to an interstitial and peritubular and not intratubular inflummation of the tail as well as of the body and head of the epididymis

3 The extension of the infection from the tail is via the peritubular and interstitual tissues and not via the intratubular tissues

4 Direct medication of the epididymisthrough the vas does not influence the infectious process because the bacteria are in the interstitial and peritubular tissues and in the wall of the tubule and not in the lumen Chamicals remain within the tubule and do not reach the bacteria

### CONCLUSIONS

T Within a few hours after the bactern have reached the tail of the epiddymis they penetrate between the epithelum involve the wall and extend to the interstitial and pen tubular tissues there to set up the inflam matery process

2 Occlusions of the epididymis following epididymitis results in the main from inter shifted and peritubular inflammation producing compression and destruction from without in acute epididymitis and fibrosis and scarring from without and within in chronic epididy

3 Epididy motomy does not consist of meding or incising the dilated tubules of the epididy mis presumably filled with pus as often stated for the inflammation is interstitial

4 Early relief of the tension due to the interstitual and peritubular inflammation is definitely indicated not only to relieve the symptoms and hasten the course of the process but also to prevent destruction and obliteration of the tubule

5 Epididy motomy should be limited to the tul of the epididymis without incision of the tunica vaginals. The purpose of the incision is to relieve the tension and provide free drainage from the interstitial tissues

6 Lpididy motomy should consist of one clean incision. The relief of tension and the regenerative capacity of the tubule which has not been destroyed by infection but his merely suffered a clean incision will reduce the incidence of occlusion and the resultant sternity.

7 Lpididymotomy particularly from the Newpoint of preventing later occlusion of the epididymis should be performed early within the first few days after the onset of an epididy mins

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# A CLINICAL INDEX OF MALIGNANCY FOR CARCINOMA OF BREAST!

1 BULLON JILL M.D. N. JOHN C STUBENBORD M.D. N. N. Yo.

210011 hi di medica es of cancer with repect to the de ree of malig nancy into one of four proups based up in the histology of the tumor His work has stimulated many others to study groups of ca c in a similar manner. Greenou h recently published the result of such a study in a trit of cales of mammars cancer and reached the conclusion that one could pre dict with rea onable accuracy the outcome et a cale depending solely on such an his tological survey The pathological laborators of the Memorial Ho pital has included for s me year a an integral part of its report of three study a grading into one of three arcup indicating the degree of malignance of the proce s. It cemed to us that so much emphasis has been placed upon in tological undings that we have lost sight of the im portance of clinical data always available for study I effection upon the subject has led us to believe that cases of carcinoma of the breast may be graded from purely clinical data which will turn b perhaps an even more accurate a timate of the degree of malignancy than the hi tology of the tumor can reveal

wide viriation i found in the clinical setting and cour c of mammars cancer for the diseas may be fital in a few months or may continue for miny years in our own experience the horte't duration being 5 months and the largest 12 years marked differen e in muliphanes exists be tween tum it mall size which have been pre ent for year and tho c of rapid growth which have been pre ent but a few weeks or month 1 mor favorable promosis should be expected when the diese i thoroughly localized a compared to the outlook when the avillary lymi h node are exten welly in volved Cancer of the breast associated with presnancy or lactation pre ents a menacing picture and usually run a rapidly fatal course An elderly woman with a well localized proc which has shown little growth activity

would be placed in the relatively being in roup rapidly growing, tumor in a young, woman would be classified as highly malignant. Upon the other hand a well encapsulated tumor of considerable size even with beginnin ulceration but without involvement of adl lary nodes is often of relatively low malignary. We have the considerations should be taken into account prior to treatment in evaluating the degree of malignancy. Such an e-timite of the patient's status based orlinical data is important for it may guide the surgeon in the matter of prognosis and determine his decision regarding operation.

Although there are many clinical factors which might be considered it has seemed to us that the four major ones to be used in estimating the degree of malignance are age pre ence of factation rate of growth and extent of thesase. These are the we thin factors and they alone have been considered in building up what we have chosen to call a clinical index of malignancy. After due consideration the weight which we assigned applications that the confideration was as follows.

\\ \lambda \cdot \lambda = 2 \quad \text{Rate of growth-P=4} \\
\text{Lxtent of disease-E=5} \\
\text{Each weighting factor was subdivided into Gradation Factors in a similar manner and arbitrary values (I able I) were given to each \text{The clinical index of milignings for am}

The clinical index of malgrane, for air individual patient is calculated by multiplying the value of each weighting factor by it gradation factor and adding the results as  $CIU = 1 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 + 3I_0 +$ 

An inspection of Table I reveal that the malle t possible clinical index is 11

malle t possible clinical index is II  $CI \ II = (rI) + (rO) + (rI) + (5II) = II$ The highest possible figure is 55

Ba ed upon such a calculation patients may be placed in one of the three grades

Crade A —11-25—relatively benign Grade B — 6-39—moderately malignant Grade C —40-55—highly malignant

Rabi h 15 fb Nwl k4 dmy (VI h mb

TABLE	Į,
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	Wght gfct	Glifi
\ge	1=2	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Lactation	L=3	Le {\langle \text{I cnt} &= 0 \\ \text{Pre ent} &= 3
Rate of growth	R≈4	Re Slow - Moderate = 2 I ap d = 4
Extent of di ease	E≈s	Small   3 cm or less = 1   Large   = 2   Node pre ent   = 4

llyg Jh H pk d I pm nt fth d th kst D Rym II I fil hool U tyf h gu In d I th

In order to determine the soundness of such an index as a guide to ultimate prognosis we have surveyed 100 primary operable patients from the breast clinic without any attempt at selection. All of these patients were treated surgically with the addition of pre operative and post operative \ radiation Table II shows the gradings according to the clinical in der of malignancy and the ultimate outcome It is apparent that a reasonably accurate

prognosis can be given by the use of the clinical index Grade A showing 69 per cent alive and well 5 vears or more after operation as compared with 34 per cent in Grade B while in Grade C but I patient or 4 per cent was without evidence of disease at the end of

None of the patients graded A died within the first year and but 2 or 9 per cent within the first 2 years A large number of the cases in Grade B succumbed to the disease in the first 2 years 22 per cent dying in the first and 41 per cent within the 2 year period Of the patients graded C more than one half died within the first year and within the first years 78 per cent had succumbed

In order to determine whether the clinical or histological grading would furnish a more accurate prognosis Dr James Ewing has graded the same 100 cases based solely upon histological study. He has placed them in one of three grades according to the degree of malignancy (Table III)

C d A	Rlt lybg	261 te t
Misc and well	5 years or more	(69%) rs
Dead within	1 year	0
Dead within	2 years	
Dead within	3 year	3
Dead within	4 year	
De id within	5 year	1
С В В	Md tlymlg t	stpt t
Alı e and vell	5 year or more	(34%) 18
Deal within	1 year	11
Dead within	2 year	10
Dead vithin	3 year	6
Deal within	4 years	3
Dead within	5 years	3
6 9 6	II ghly m l g t	23 p t t
Micandwll	5 years or more	(4%) 1
Dead within	1 year	12
Dead within	2 years	(
D ad vothin	3 years	2
Dead vithin	4 years	0
Dead within	5 years	1

A study of Table III reveals that in the relatively benign group 52 per cent of the patients were without evidence of disease 5 years or more after operation whereas by the clinical grading 60 per cent of these more favorable patients were alive and well at the end of this period. In Grade II 33 per cent survived a years free from disease a figure closely comparable to the 34 per cent ob tained by the clinical grading In Grade III the histological grading showed 20 per ce t alive and well at the end of 5 years compar d to 4 per cent by the clinical grading

TABLE III II	istologic\l grai	ING
( d	Rlt lyb g	3pt t
Mixe and well	5 years or more	(52%) 1
Dead within	z year	1
De id within	2 years	4
Dead within	3 years	4 5 0
Dead within	4 years	
Dead within	5 years	1
C 4 11	Mitlymlg t	63 pt t
Mive and well	5 years or more	(33%) 21
Dead within	i year	18
Dead within	2 years	11
Dead vithin	3 years	(
Dead within	4 years	4
Dead within	5 years	3
C d III	Il ghly malg t	4pt t
Mr e and well	5 years or more	(29%) 4
Dead within	1 year	4
Dead within	2 years	3
Dead vathi	3 years	0
Dead within	4 years	1

5 years

Dead within

TABLE IN —COMPARATIVE CLINICAL AND HISTOLOGICAL GRADINGS

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	5	G	d	ĵ	6	L				_
N dwll D d th D d vith D d th 3 D d th 4 D d th +	O	(		III	-	9	6	1		-
V d II		(	1	ı		Ī	Ī	Ī		_
Dd th 3 6	b	G	ď	II		,	5	H		_
D d th D d th D d th 3 D d th 4 D d th 5 D d th 5+		(	ď	111		3				_

obvious that the histological grading, ful to place a sufficient number of the more favor able cases in Crade I Turthermore it does not draw a shirp distinction between Grades III and III for the figure for these two grades for satisfactory 5 year results are too closely computable Grade II 34 per cent Grade III 20 per cent \ much wider di vergence should appear to have the gradings of any significance

In Grade I (histological) 4 per cent died within the first year compared to o per cent for those graded clinically and within the first 2 year 2 per cent succumbed to the disease in comparison to 9 per cent for those in clinical Grade \ In Grade II (histological) 29 per cent died within the first year com pared to 22 per cent of the chincally graded cases Within the first years 46 per cent succumbed to the disease while 41 per cent of the patients graded clinically died In Grade III 29 per cent died within the first year and 50 per cent within the first years in comparison to 50 per cent and 78 per cent for the clinically graded patients

Table IV matches up the 5 year results in

100 cases and indicates how the patients in each clinical grade were graded histologically In the relatively benign group (clinical) 10 of the patients remaining alive and well were placed in Grade II on a histological basis It is evident that these patients should have fallen into the relatively benign rather than the mod erately malicnant group. Of the patients in Grade B (clinical) two of those remaining alive and well were considered Grade C cases when the histological grading was followed. Of the highly malignant group according to clinical grading o of the patients who succumbed to the disease within one year were classified Grade II cases on a histological basis It seems fair to conclude that the clinical grading made a more accurate selection of the patients than did the histological

One reason for the failure of histolo ical grading to provide a correct pro nosis lies in the fact that different histological pictures indicating varying degrees of malignancy may be found in various portions of the same The study of a small section may reveal one type of histology while another section may show a much more mali nant type of tumor growth The study of large sections initiated by Sir George Lenthal Cheatle and first used in this country by Mr Cilis of the laboratory staff at Memorial Hospital demonstrates the marked variation in histological pictures in different portions of the same tumor and shows the difficulty of histological grading for any one patient

Moreover histological grading fails to provide a correct prognosis because no considerationis given those important clinical factors determining the ultimate outcome of the disease

From this study no doubt can exist that the histological grading is far less effective in formishing an accurate prognosis than i the clinical griding. We are firmly convinced that the grading of patients based upon the clinical index gives a more accurate estimate of the type of disease and the ultimate prognosis than does any other grading hitherto propo ed

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# ACUTE PERFORATION OF PEPTIC ULCER

SIC VIFICANCE OF UNUSUALLY HIGH INCIDENCE AMONG SOLDIERS IN HAWALL

BY JAMES M FROUTT MD BA FACS HONOLULU HAWAII

Maj Med 1C p U Amy Surg 15 Tpl U S Army C 1H pt 1 H 1 T 1 ry (H wa

HLN I first took over the surgical service of one of the large army hos pitals in Hawin I was astomshed at the relative frequency of admissions for acute perforated peptic ulcer. It was an experience unparalleled in 20 years of practice and led to an investigation, the more important elements of which are herewith reported.

It should be stated at the outset that the subject is approached from a surgical area point and with special reference to its bearing on the military service. The term peptic ulcer is taken to connote both gastric and duodenal ulcer as well as the more recently recognized gastrojejunal or marginal and jejunal ulcer.

After a review even incompletely of the literature on peptic ulcer it seems presumptious and reprehensible to add to the already voluminous bibliographic incubus. The tisk of reading correlating and evaluating what has been written for the last oyears on only one aspect of the subject ie, ruptured peptic ulcer has been enormous. Speck (6) in 1023 appended 5 pages of bibliography to an article on perforated gastric and duodenful ulcer. Nevertheless contemplation of detached aspects of a subject affords individual pictures a slow motion glimpse as it were and aids in the cinematoscopic vision of the whole subject.

# OBJECTIVES OF STUDY

The two aspects of acute perforated peptic ulcer with which I am chiefly concerned are its incidence and treatment. As a corollary of these however one is inevitably forced to a consideration of the etiology of peptic ulcer in general. It follows than that the objectives of this study may be stated as follows.

To demonstrate or disprove the presence of an unusually high incidence of perforations among soldiers in Hawaii

2 To ascertain whether or not there are any etiological factors peculiar to a Hawaiian en vironment responsible for the undue incidence of to draw such conclusions as may be possible from the report of a small series of cases with regard to the treatment of acute perforations generally and in the military service particularly.

# INCIDENCE

Statistics as to the incidence of peptic ulcer have been notoriously unreliable and are fre quently not even mentioned in some of the Intest textbools A percentage incidence based on clinical cases diagnosed as ulcer and without reference to population is open to many obvious objections Pathological sta tistics are more dependable but ulcers fre quently heal without leaving a scar and the dividing line between a postmortem ecchymo sis or erosion and beginning ulcer is often very tine Derver (1) says that his study of some of the autops, material (500 cases) of a Phila delphia hospital fuled to demonstrate the number of ulcers and healed scars in the du odenum and stomach reported by other ob He was referring to the report of Sturtevant and Shapiro (10) who found from a review of 7 700 necropsy records of Bellevue Hospital that about 2 per cent of the patients had had either gastric or duodenal ulcer or had evidence of having had an ulcer

Nevertheless statistics serve as a basis for comparison and I have chosen Morton's (4) figures for this purpose He says Combined clinical statistics show 3 0,6 cases diagnosed as ulcer among 330 575 patients 1 e o 804 per cent combined statistics of autopsies of vari ous series show 2 608 ulcers out of 59 450 autopsies ie 44 per cent Morton (4) quotes Robertson and Hargis who found ulcer or scars of ulcer in 189 per cent of 2 000 necropsies Annual reports of the Oucen's Hospital Honolulu which is the only general hospital serving the civil population of Hawaii hat for 1925 of 6 000 cases treated 14 gastric or duodenal ulcers with a percentage of o 33

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and for 1926 of 6 000 cases treated 7 ulcers

with a percentage of o 45

I able I gives the incidence of peptic ulcer in officers and culisted men of the U.S. Army by celor and country from 19.2 until 19.6 the incidence of gastric and duodenal ulcer is given eparately. The figures are rates per account and preparates.

Table II is a consolidation of the data contained in Table I and consists largely of totals for the 5 year period from 192 to 1926

The average incidence of peptic ulcer in the United States Virny as a whole for the 5 year period from 192 to 19 6 rate per 1 000 is 07. This is about one twelfth of Morton's

percentage of clinical cales

By reference of I gures 1 and 3 it will be seen that the ulmi ion rate for peptic ulcer in Hawaii is decidedly below the same rate for the entire arm. A further comparison with the admis ion rate for white chisted men ering in the Unite! State how that with the exception of 10 4 peptic ulcer his been less common among dider in Hawaii.

This inding might be criticized on the ground that peptic ulcer has not been dag no da sfrequently in H wail as in the United States were it not for the fact that there is a close corre pondence between the rates for each year by country and total army. Again the medical officer personal of the military hospitals in H wail has been changed on an average of at lea t twic in a 5 year period. This reduce the personal element in diagnosis to a minimum.

The greater in idence of peptic ulcer in the civil population as compared with the military service is recibile coplained by several factors. Among the mist important of these are the age limits of service in the army which are 18 to 64 year with an overwhelming predom nance of individual who are in the third decide of life or who fall into the last years of the sec nd decide. Then too officers and eall ted men mu t pass a strict physical examination before entry into service.

### INCIDENCE OF PERFORATION

The consensus of opinion of most authors is that acute perforation complicates peptic ulcer in about 1 per cent of all cases. However, the percentage of perforations in this series of 406 cases of ulcer which occurred in the U S Army during the years 19 2 to 19 61 less

being 8 87 per cent

Table III gaves the actual numbers by country of annural admissions for perforated uder in officers and enhisted men in the U.S. Army as well as the percentage of ulcers ruptuning Analysis of this table shows a consistently greater percentage of perforations occurrin in peptic ulcer in II wan as compared with the United States with the exception of the year 1922. During that year but one ulcer was reported from Hawaii and no perforations. For use 4 graphically portrays the comparison

The percentage of total ulcers perforatin during the 5 year period from 1922 to 19 6 in collisted men in Hawaii was 33 3 per cent as compared with 7 77 per cent in the same class of soldiers serving, in the United States

Tables IV and V give the total percentages and incidentally bring out the fact that where as in 19 1 out of 41 ulcers ruptured in 1926 1 out of 7 ruptured

#### SUMMALLY

From these statistics one may conclude that

that
r Peptic ulcer occurs one half times more
frequently among white soldiers serving in the

United States but perforates four times more frequently among soldiers in Hawaii Pentic ulcer is steadily on the increase in

1 cpite dicer is see :

the United States Army
3 The percentage of ulcers which perforate
that is to say acute perforations has in
creased almost sevenfold since 19

### SIGNIFICANCE OF BIGIN INCIDENCE OF PERFORATIONS

It has been generally agreed that climate season and altitude have no relationship to the development of peptic ulcer or to perforation of an ulcer. Annual admission rates from disease in the U.S. Army for the last decade published by the Surgeon General prove that Hawan is the most healthful country of any in which white troops serve including the United States.

The climate in Hawan is subtropical but cooled by trade winds it is equable and with

TYBLE I —INCIDENCE OF ULCEP OF THE STOWNCH AND OF THE DUODLINUM PER ONE THOUSAND OFFICERS IND EN ISTED MEN BY COLOR AND COUNTRY

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out distinct seasonal variations. A slightly lower mean annual temperature and increased precipitation prevails at the 17my post of Schofield Barracks, which is situated on an upland plateau 900 feet above sea level. All other army posts in Hawan are virtually at sea level.

Among soldiers in Hawaii for the years from 1922 to 1926 7 out of 10 70 per cent of the perforated uleers occurred it Schofield Barracks. Of the 3 remaining perforations were in one individual who sustained a rup tured jastric uleer and 3 months litter a per forated duodenal uleer. But since about 61 per cent of all troops in Hawaii have been stationed at Schofield Barracks and since their

annual admission rates from disease have been in the proper proportion the significance to be attached to climate and altitude in this connection is minimal.

In Hawan only the rates for diseases of the eye and ear and the skin and cellular tissues such as refractive errors conjunctivitis official cellulations trickophytosis and other skin diseases, exceed the admission rates from disease for the United States troops serving in any country. The influence of the usual chological factors of peptic ulcer as infections endocrine disturbances dysfunction of the nervous system and associated diseases is certainly reduced in Hawan. Flus has been evidenced by a low incidence of peptic ulcer but the inex

TABLE II —ANALYSIS OF FOUR HUNDRED AND NIVETY SIX CASES OF PEPTIC ULCER OC CURRING IN THE U S ARM'S DURING THF PERIOD FROM 1922 TO 19 6

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plicable thing is that more uleer perforate in Hawaii

The American soldier takes with him to service in overseas stations his own food and drink and lives under conditions as similar as is possible to those in the United State staple articles of the oldier dict in Hawaii are much the ume as in the United States Certain fruits indigenou to Hawaii nich as the pineapple banana papaya ayocado etc are undoubtedly enten to a prenter extent than in the United State However nute gastritis and diarrhota from this crust are almost un I nown and the trepical dysenteries do not occur Although definite proof is lacking it is probable that the pin apple contains a diges tive terment imilar to papain from the pa paya Papun re embles trypsin in its proper ties but act in an acid alkaline or neutral medium. It is possible that the e ferments may be a factor in causing perforation of ul c rs by autodisc tion of ulcerous areas but hardly probable that they can initiate an uker

The habit and social customs of the American soldier on foreign service are the factors chiefly affected by a changed environment I vact figure are not available but rehable estimates from company commanders medical officers and individual soldiers are that oo

per cent of the soldiers in Hawaii are habitual smokers. Estimates of the proportion of address who indulge in alcoholic liquors are not so reliable because the habit is rigorously frowned upon by the military authorities and because procurement of liquor is illicia.

The average annual admission rate from alcoholism per 1 000 of troops serving in Hawan for the period from 1022 to 1026 is slightly lower than the rate for troops in the United States but the number of admissions to the hospital or the number of men excused from duty for alcoholism is not an index of this vice. It is well known that many soldiers indulge during the hours off duty and under circumstances which do not come to official notice Chaplains welfare workers company commanders and medical officers agree in the estimate that 60 per cent of the soldiers in Hawan are occasional drinkers that to per cent are habitual drinkers and that 20 per cent use alcohol intemperately in that they indulge to the extent of a spree or debauch at least once a year

The impure character of the illiest higher consumed is of far greater importance than the actual amount. There are some few conditions under which medicinal or commercial alcohol can be and has been converted to beverage purposes. During 19 6 it Schoffeld Barracks 6 soldiers died and were rendered almost blind from drinking bay rum containing wood alcohol.

The form of alcohol most easily available to which is peculiar to Hawaii. Another form of liquor which is cheiper and of lower alcohol proof is a ferimented beverage colloqualli. known as swipes. Okolehao is ordinarily distilled from ferimented rice although it was originally made from the tri root mash. There are all grades and qualities of the liquor but it is evident that being made for a quick, ale and a safe getraway, there can be no guarintee of its purity or age.

A common practice is to improve its appear ance and tiste by allowing sticks of charcoil to remain in the white product for a few days and then adding caramel or other coloring matter Another method which is even more question able is to wash the liquor with solutions of

TABLE III —ADMISSIONS FOR PERFORATED ULCERS OF THE STOMACH AND DUODFNUM AMONG ENLISTLD MEN IN THE U.S. ARMY AND FERCENTAGE OF RUPTURES

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T tal		8	__	- 6	7 3	~[	44 4	1-	5 4	44	8
Gt dttl		4	7 77		33 3	1 4	43 4	ئب		نتسك	

potassium permanganate These processes are called 'aging the product" In a great many instances even this is dispensed with as the white article finds a ready sale to a larger if not more choice clientele

Swipes as its name indicates is of humbler origin. It is a fermented drink made from pineapple parings, cane juice or a mixture of any of the fruit juices.

The psychic reaction of soldiers to a Ha waiian environment is worth at least passing notice. In the first place Hawaii is generally reached by the recruit after a rail journey and sea voyage of approximately a month is duration counting the delays in embarkation de pots and ports. The voyage at sea is not overly conducive to a settled frame of mind as it has been a succession of contacts with new associates in unfamiliar surroundings and with the usual discomforts of ocean travel

During the period of mental adjustment to a new environment many recruits suffer with nostalgia and overindulge in smoking or take up the habit anew. I believe that smoking and drinking in soldiers in Hawan is at first but an expression of mental unrest. The dan geris that later they may find that they have formed definite habits. It is not for want of

better amusements that a great many soldiers in Hawan drink and smoke to excess. It is but the natural consequence of a new environment where they find the means at hand

Attention may be called to the fact that water famines existed at Schofield Barracks for several months during the spring and sum mer of 1924 and 19 6 although water was plentiful elsewhere on the island at that time At the Schofield Barracks however water

TABLE IV —PERCENTIGE VAPIABLES OF TOTAL PETTIC ULCERS IN THE U S ARMY PERFO RATING DURING THE PERIOD FROM 1922 TO 1926

Peptic ulcers pe forating 16 36 St St State ulcers perforating 16 36 Duodenal ulcers per forat g 1 spite ulcer end sted men in U S perforating 77 77 Lepth ulcer endisted men in Hawam Ferforating 33 30 State Ulcer end sted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforating 33 30 State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer endisted men in Hawam Ferforation State Ulcer end

TABLE V—INNUAL IERCENTAGE OF TOTAL PEPTIC ULCERS PERFORATING IN ENLISTED UP IN THE U S ARM DURING THE PERIOD FROM 10 2 TO 1920

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922 9 3 9 4 19 5	P t 43 7 4 9 09 8 03 4 17	rout of 41 rout of 14 rout of 14 rout of 11 rout of 12 rout of 7



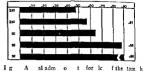
Ig \ 1 dm t f ! coftle t m h d l f tl d d m mb d (pp1 ul ) p n d l t d m tl U S \ 1 m y d g the

we used which is usually considered non potable in that it contained organic impurities such as algreand bacteria. In addition the water was unpalatable and may have been irritative from excessive amounts of chlorine iron rust mud or sediment. There is no rea on to believe however that the iron rust or lava particle which consisted largely of silt cates of iron and mangranese was productive of gastro intestinal irritation. Iron rust in finishing water is frequently encountered without amy ill effect.

The chlorne content of the water during, the famine period was never greater than three parts per million. Although this amount of chlorne is much higher than that ordinarily used to treat drinking, water in the United States it is the usual amount added to the water at Schonled Barracks. The bacterial count during the last period of water shortage at Scholidd Barrack, never went above 15 colonies of colon bacilliper cubic centimeter.

In any event the incidence of perforated ulcers at Schoneld Barracks as compared with other army post in Hawaii and the civil population of Hawaii 1 quite in proportion to the troop stationed there

Direct trauma in the form of blows on the stomach and lon, continued epigastric pressure a in shoemaker and horseshoers has always been con idered a factor in the production of uler "schwitz (8) ob ervel perforation of a gastric uler by a stomach tube Powers (7) rep riel the rupture of a silent uler from external trauma but it is much more probable that the frequent internal trauma of the mucosa from dietary errors is more umportant. In a su ceptible individual continued dietary errors cru but aggravate an



Ig A aladm o t for lc f the tom h
d f the d od um mb ed (pept ulce) p ooo
wh te I t d m a in th U S \ my the United States
d g th period from 19 to 926

ulcer prevent its healing and possibly be the direct cause of rupture

Soldiers are supplied a well balanced diet of adequate calories through the ration savings method according to Gessner (3). It is a com mon practice however for soldiers to patron ize liberally the lunch stands and short order restrurants. The particularly permicous fea ture of this habit is the eating at late hours of a viriety of food which is both untimely and generally indirectstible.

It has seemed to me that the most sind cant fact with regard to perforated ulcers among solders in Hawaii has been the large percentage of acute ulcers. In a sense of it croses which were studied 4 of the solders gave an entirely negative gastro intestinal history prior to rupture and 1 had had slight discissive symptoms for only 2 months. In half of the cases then the first symptoms of ulcer were those of perforation. One can only conclude that these were very probably acute ulcers.

It is well known that acute ulcers are common and may cruse such few or minor symptoms as to escape notice entirely. Sturtevant and Shapiro (to) in an analysis of 7 700 necropsy records found that of 86 open gastre ulcers 24 4 per cent were acute. Fenuck (2) cutes 29 per cent of 11 cases as being acute.

Ordinarily the greater percentage of acute ulcers heal readily and the patient is unaware that he was ever threatened. It is only the susceptible individual the one in whom the usual factors of safety are lacking who develops a chronic or true peptic ulcer.

There is one aspect of experimental ulcer which many investigators have observed and which seems worth mentioning in this connection and that is the relative frequency of per-



Fig 3 Annual admission rates for ulcer of the toma I and ulcer of the duodenum combined (peptic ul r) per 1 000 white enlisted men in the U S Army in Haw ii during the period from 1922 to 1926

forations in acute experimental ulcer as com pared with the rare occurrence of this compli cation in subacute and chronic ulcer or in ad vanced stages of an acute ulcer

It seems to me that if half of the perforated ulcers occurring in soldiers on duty in Hawaii are acute ulcers some particularly acute irri tating factor or combination of factors must be at work to produce acute erosions of a high degree of seventy Most of these lesions heal since the incidence of chronic ulcer in Hawaii is far below that for other countries but on account of their acuteness and the severity 3 large number perforate

Since the time of G de la Tourette (11) alcohol has held a place in discussions of the cause of peptic ulcer It has been generally admitted to have a more important effect in causing perforation since many perforations have been preceded by an alcoholic spree

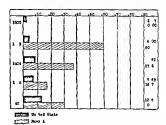
Moymhan (5) is convinced that excessive smoking results in hypersecretion and is an undoubted cause of ulcer

# CONCLUSIONS

Peptic ulcer occurs half as frequently among white soldiers in Hawaii and perforates four times as frequently as among enlisted men of the army serving in the United States

² The number of peptic ulcers and the percentage of ulcers which perforate has ap preciably increased in the United States Army during the period from 192 to 1926

3 The factors which are responsible for the high incidence of acute perforated peptic ulcer



Annual percentage of perforating ulcer of the t ma h and of the duodenum combined (peptic ulcer) in er is ted m n in the U S Army in the Unite I States and Ha van durin the period from 1922 to 1926

amon, soldiers in Hawaii are fundamentally psychic and include nostalgia mental depres sion lowered nerve tone excessive smoking and most important of all the excessive use of impure alcoholic beverages

I take the opportunit to thank the Surgeon General of the U.S. Army for permi ion to report the e.ca es. I am indebted allo to the Surgeon General for the stati tical data incorporated in the article and for aluable as istance in their preparation and correction

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TOLRETTE G DE LA Ouoted by Morton

# CLINICAL SURGERY

FROM THE ORTHOPÆDIC SERVICE INCO ITS HOSPITIL MINCHESTER

# THE OPERATIVE TREATMENT OF TRAUMATIC ULNAR NEURITIS AT THE ELBOW

BY HARRY PLATT MD MS (LOND) FRCS (FNG) MANCHESTER ENGLANDS H yS g A H p i Cl II, t Othed S gry V y fM h

WHL\ n nerve trunk hes in close relation to a skelerial structure it occupies a some with hearing sostion. Classical examples are the musculospiral nerve in the groove on the humerus and the lowest trunk of the brachal plexus as it crosses the first rib (or more particularly a supernumerary rib)

The nha nere is also subject to the same potential disady natages in its short course be hind theelbow. During each movement of flevion the nerve is slightly stretched but its normal elisticity and mobility allow it to respond to changes in tension without incurring damage. This compensatory mechanism is most easily up set if either the nerve trunk itself or the bed in which it lies be injured. Under such con litions a traction or friction neuritis may be induced to repetited unforced movements of the elbow. A neuritis is even more readily evoked in an anchored nerve if freed movements of the point are used at cert un stages in the treatment of the elbow ninus.

The ulnar nave may also be affected adversely it is mobilist. I early ter ted an anomaly which exists in a certain unknown number of individuals. The hayermol is nerve usually slaps for and on a the eque able but not beyond it during fix in oil the elbow but continues to do so with impunity. It however the dislocation becomes implied and occurs with each move ment of flix on then it is almost certain to sustain dama e. Here again a friction neurities is proposed.

The lesions in which a disturbance of the normal relation bety on the nerve and its bed is of etiological importance are mainly incomplete and thus may be described under the title. Traumatic Ventrius

The following clinical groups may be distinguished in these lesions

P! II E J'S OGN S VIII

- r Primary neuritis
  - a Simple contusion
  - b Complicating

internal epicondyle fractures supracondylar fractures dislocations of the elbow

Secondary neuritis—complicating fractures of the lower end of the

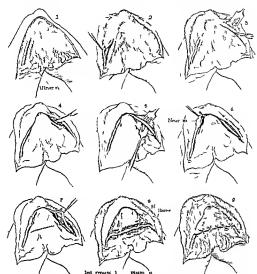
humerus dislocations of the elbow joint

- 3 Delayed neuritis
  - a Late ulnar palsy -a sequel of external

b Recurrent dislocation of the nerve

In the treatment of the milder forms of neuritis conservative measures often suffice. When the injured nerve is but under the conditions of com plete rest by prohibiting all movements of the elbow spontaneous recovery is usually seen This is true of the average ulnar neuritis associated with recent fractures of the humerus. But in severe and persistent forms of neuritis operation gives the best chance of rapid cure For late ulnar palsy or the neuritis due to recurrent dislocation conservative treatment has little to offer and operation is always the method of choice. In in complete lesions of the ulnar nerve at the elbow where there is incongruity between the nerve and its bed an ideal neurolysis is available the operation of anterior transposition in which the nerve is displaced to the front of the elbow and implanted in a new bed. By this means the course of the nerve is shortened and with each movement of flexion is relaxed instead of stretched as formerly

Anterior transposition has a still wider application in the treatment of ulnar nerve injuries as a whole for the additional relaxation obtained when the elbow is fully flered makes it possible to achieve end to-end suture in grave lessons with loss of contunity. In the peripheral nerve surgery



Reversed resistion of the limb for operation on the ulnar nerve It 2 The kin flap reflected Tle ulnar nerve lying on the triceps

Fi 3 Freeing of the nerve in the upper arm Fig 1 Exposure of the nerve in the forearm The line

of division of the aponeurosis big 5 St litting the line of fusion of the two heads of the flevor carps ulnaris

of the late war this technical maneuver was used in a considerable proportion of ulnar nerve sutures (50 per cent in the writer s series1)

# OPER ATION OF ANTERIOR TRANSPOSITION OF THE UINAR NERVE

Position of the limb (1) It is usual to place the outstretched arm at right angles to the body and supported on some form of rest difficult nerve sutures the 1rm must be brought close to the side in the final stages of the oper ation-a most awkward change () The writer has used for many years an alternative position

1: es [ N ]

S gry fP pheral N

Fig 6 Exposure of the nerve in the forearm is shown completed

Fig. 7 Fusiform neuroma which is located just provi mal to the groo e Fig 8 Construction of the nerve bed First stage in

cision of flexor aponeurosis Fig 9 Construction of the nerve bed Second stage,

division of the mu cular fibers and division of the internal intermuscular septum

for all operations on the ulnar nerve except when the exposure is to be limited to the lower third of the forearm The position adopted is simply the one in which the nerve is relaxed to its great est capacity ie the upper limb is held across the body with the upper arm vertical and the elbow and wrist flexed (Fig. 1) The fullest exposure can now be made and when a considerable gap is present the actual nerve repair is easily completed without the slightest change in the position of the limb The patient's head should be completely hidden by the sterile towels and the anæsthetic conveyed by one of the recognized long distance methods (Shipway apparatus

Pinson ether bomb )



Skin in t i m. At  $x_t$  the ellow the skin cut is |1| i |1| into I clim I the line of the internal pic n lyle. At the elbow it lies of or the mid lim, if the orc. e. In I clow is ontinued in the cut e. If the ner e. A flap is turned back, opposite the e|e|e| ndx| to expose the area in which the nex n rec be its to be mide.

Epn fike inc The nerve is approached it is do set heles in next below the lesion and mails in the upper of mether income in the next trunk lim on the traces shows as a variete of through the lept fasca (In. 2). The litter is do the credible from just below the cyronishe and the nerve guist freed for a distance of not be than makes. The fine accompany of year of the inforcer profundly should be separated in mether exchanged and preserved in certain (i. 8). Incurtis the nerve trunk is almost ills level (Ing. 3).

In th f trm the d cp fascia is divided over the line I full nef the two heads of the flexor of p uln in the upper third (Fig 4) The fibr u litr (t n t) and which the muscular fil is run in fun lil c fashi n is split (Fig c) and the int r il let cen the two heads opened up to displa th il tii fundus digitorum Thenerve trunk is n s a lvin on this muscle belly cov crelly thin emit insparent fascia and is freed is far is the liver end of the groove (Fig. 6) At the time the it simal branches come into view in 1 min t ! irefully preserved Although r it us they are usually three in number in I reinate in the following order (1) I fine two supplying the elbow joint arising in the upper part of the groove (2) a branch to the flexor carpa ulmans (occasionally two sepa

rate branches to the constituent heads) and (a a stout branch to the profundus digitorum

In the groote the deep fascia covering the nerv is divided and the trunk freed by dividing the filamentous adhesions of the nerve sheath to the floor of the groove The actual lesion is no open to inspection and will correspond to one the following types (1) Severe neuritis com plicating recent fractures of the lower end of the (a) The nerve trunk shows little change in contour but is abnormally pale it sheath is thickened and closely bound to the groove by tough adhesions (b) the nerve trun shows a localized constriction or flattening Proximal to this area there may be a sli ht fus form enlar ement (c) an early nerve spindle (fusiform neuroma) may be present. The spindle is usually situated in the upper part of th groove or just above the epicondyle where th latter has been displaced as a result of fractur (Fig 7) () In late ulnar palsy a nerve spindle is always found if the signs of neuritis ha e existe for some time. A similar le ion is also seen i recurrent dislocation of the nerve (3) In the graver lesions associated with compound injurie (gunshot or civil) a variety of change 1 seen

Transposition of the neric The neric trind irecd from its bed in the whole extent of the wound is drawn forward over the epicondyle I will be seen that the neric cannot be displaced are enough at this stage, as it remains tethereby the proximal branches. The uppermost branch to the elbon joint should be divided as its values negligible but the two muscular branches mus be conserved. It is possible to achieve this and at the sume time free, the parent trunk—(a) be stripping up the branches from within the sheatl of the nerve and (b) by stripping, them in the intramuscular course. By this delicate mareuce the branches are artificially elongated. The ulias mere now falls easily in front of the expoordile with the branches running brekward under slight

The neric bed. It is unsound practice to leaviet transposed nerie in a subcultineous position as recommended by a number of writers. The bed should be fashioned in an intrimuserulal plane. A suitable bed is provided by dividing the aponeurosis and superficial musically fibers of the common flevor origin from the epicondyle. With the arm in the reversed position and the elbow flevod this incision forms the base of a trian le with the epicondyle as its aper, (Fig. 8). At the incision divides the epicondylahead of the flevor carpi ulmaris just provinal the point of entry of its motor neric. The neric

trual, is now placed in the intramuscular gutter and the area of the lesion deeply buried (Fig. 9). There remains a most important step before the nerve is finally hidden by suture of the deeper parts of the wound. As at leaves the upper arm the nerve tends to be kinked or bowstrun, on the edge of the internal internue cular septum. This structure is therefore cleared on each aspect, and generously exsected, where the nerve crosses (Fig. 9).

Care must also be taken to prevent kinking of the nerve as it turns downward to continue tis course in the forearm. An alternative method of burving the transplanted nerve is available in lessons in which resection and end to end suture are necessary. Instead of the flevor muscully fibers being divided a tunnel may be made through which the two ends of the severed nerve are drawn.

Closure of the wound The divided uponeurosis is sutured over the transposed nerve the condular head of the flevor carpi ulnaris is repured and the split in the latter muscle is closed as is shown in Ligure 10

Hier treatment. The ellow is sling in moder ite fluvion for 10 days and mobility of the fingers is encouraged from the first. The treatment adopted in the later stages depends on the associated bone or ionit lesion.

# RESULTS OF THE OPERATION

Anterior transposition of the ulnar nerve ful fills all the canons of the ideal neurolysis. This operation has been carried out by the writer on more than one hundred occasions for the various indications already enumerated and with results which are most gratifying

# FROM SECTION LARY AGOLOGY ORAL AND PLASTIC SURGERY WIND CLINIC

### A TWO-STAGE LARYNGECTOMY¹

BY GORDON B NEW MD FACS ROCHESTE MINNESOTA

If it becomes necessary to remove the larynx because of malignant growth it is of first im portance to remove the growth completely and to guard the patient against reaction. The result should be a tracheal opening which does not require the use of a tube In the old two stage operation of Crile the nationt usually was obliged to wear a tracheotomy tube. The one stage opera tion of Mackenty, while overcoming this disadvantage and being technically more simple re quires a great deal of postoperative care from surgeon and nurses The two stage operation I am now using seems to combine the advantages of both of these operations without the disad vantages of constant close postoperative care drainage tubes and frequent irrigations necessary in the one stage operation and the occurrence of tracheal stricture in the old two stage operation

Thy rotomy and excision is performed without the removal of cartilage in cases of carcinoma in volving the anterior two thirds of the vocal cords without fixation the grade of malignanci, the a c and general condition of the patient being taken into consideration. Lary ngcotomy is performed in the more advanced cases with fixation

During the three year period if m io 5 to 1927 inclusive 171 patients suffering from carcinoma of the larvin have been extimed in the Mayo Clinic and 64 of these have been operated on In 7 instances thyrotomy and existon were carried out and in 42 larvingectomy was necessary. This group includes certain extrinsic cases but not the epiglotic or posteriood cases in which lateral pharyingtomy following the method of Trotter might be performed. There were 5 explorations Ti sue obtained at hoops, was examined the day previous to the operation in all cases in which larvingectomy was the p frormed.

The operation I um now perfortung has been a gradual evolution from the old two stage laryn gectomy. Before the first stage is performed a Rehfuss tube is passed into the esophagus through the nose for feedin purposes. Local infiltration of o 5 per ent solition of procaine is injected in the median line of the neck from the chin to the manulurum laterally to the trachea and laryn and deeply in the region of the hyoid bone. A median line mession is made extending from just above below the symphysis of the lover jaw to just above

the manubrium (Fig 1) Sharp retractors are placed in the upper part of the wound and the hyoid bone is exposed and divided in the median line by means of bone forceps (Fig 2) Sharp re tractors then pick up the ends of the divided hone on both sides and retract them laterally. This allows the larynx to come up into the wound and simplifies the completion of the dissection Blunt retractors are placed in the lower portion of the wound the muscles are separated and the 15thmus of the thyroid gland divided. The larvax and the two upper tracheal rings are skeletonized ante riorly and laterally (Fig 3) The skin on both sides is sutured to the arcolar tissue anterior to the second tracheal ring. The wound in the skin is then closed with dermal sutures the upper por tion of the trachea being left exposed trachea is not opened. A split rubber tube is placed at the lower extremity of the wound which completes the first stage of the operation (F1 4)

The reaction is much more severe from the first stage than from the second although the yound is clean and the trachea has not been opened. The temperature usually rises to 101 de rees F the first night and gradually drops to normal about the fourth day A barrier to the soft tissues of the neck is created thus preventin later infection of the neck and mediastinum from the tracheal or pharyngeal secretions The day the temperature reaches normal the trachea is anæsthetized by the injection of 10 per cent cocaine between the tracheal rings into the trachea and a di c of carti lage | removed from lower margin of cricoid carti lage to allow the tracheal secretions to infect the wound This opening may vary in position up ward or downward depending on the site and ev tent of the growth If it is po sible to save the cricoid cartilage an opening is made in the cricothyroid membrane If the growth extends well down in the larynx the tracheal opening may be made below this point. The patient becomes immunized to this type of infection from the trachea and at the same time the trachea becomes accustomed to the air passing directly into it Four days after the trachea has been opened the larynx may be removed without the usual reac tion

In the second stage of the operation para erte bral block anæsthesia together with superficial

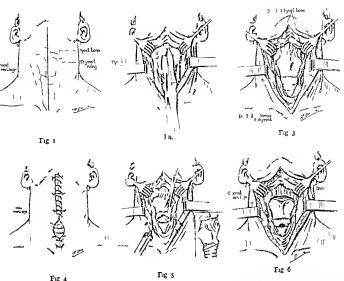


Fig 1 Median line inci ion
Fig 2 Forceps dividing the hyoid bone in the median i e

Fig 3 Sharp retractors have picked up both end of the divided hyoid bone. The isthmus of the thyroid glund has been divided and the larynx and upper trachea have been skeletonized anteriorly and laterally

Fig 4 Closure following first stage The dotted line indicates where the di k of cartilage is removed about 4

day following the first stage

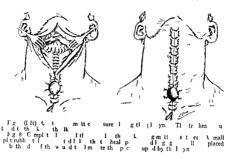
cervical block (r) is used. A small amount of the anæsthetic agent is infiltrated on both sides of the wound in the median line. The wound in the neck is freed usually by means of the index finger the outline of the larynx and trachea being followed. The cut ends of hyoid bone are retracted by shirp retractors. Blunt retractors are placed in the lower portion of the wound and the neck is freed as at the completion of the first stage. The mucous membrane of the upper part of the trachea is anæsthetized through the tracheal opening by means of swabs soaked in 10 per cent cocaine. A small tenuculum picks up the circoid cartilige and

Fg 5 S cond stage The wound has been freed as at the completion of the first stage. The traches 1 cut across Tle arro vs and syn indicate the infiltration of procaine back of it e larynt for anisathesia and harmo table in earl indicates the po sible conservative removal of the larynt leaving the lower portion of the circoid to be sutured to the skin.

Fig 6 The inci on above the larger is made to obtain a new of the growth from above before it is completely

remo ed

hits the larynx into the wound. The tracher is then cut across usually above the first tracheal ring. If it is believed to be possible the lower two thirds of the cricoid cartilage may be saved thus affording a much larger cartilaginous ring to which the slan may be sutured (Fig. 5). As soon as the tracher is cut across o 5 per cent procaine is infiltrated back of the larynx. This controls oozing and anesthetizes the pharynx at the point difficult to control by block anæsthesia. The laryna is dissected free posteriorly by means of Mayo dissecting scissors almost to the region of the arytenoids. If the growth extends posteriorly



and there is any question as to its extent at this point the thyrohyoid membrane is out across and this part of the larny in spected as suggested by Mackenty to make sure that the growth may be wilely excised (Fig. 9). The removal of the lary ax is then completed.

The pharyngeal opening is closed with two rows of continuous mattress suture of chromic catgut with turning in of the mucous membrane (I ig ) The lower two thirds of the margin of the incision in the skin on l oth sides is pared and any superfluous fat removed. The skin is then sutured around the margin of the tracheal open in with silk sutures The upper part of the wound is closed with silk mattress sutures. The wound in the neck is closed completely. One split rub ber tube is inserted at the lower part of the wound l elow the tracheal opening Roll of gauze are place I perpendicularly on the neck on both sides of the incision with pressure in or ler to fill in the space left by the removal of the larynx and to support the pharen eal wound they are held in place by means of adhesive plaster (Fig. 8) A tracheal tube sin erted

Followin this state there is usually a shift refection the temperature returns to normal in from a to 5 days (Fi s y to r). The dressing, of the part of the wound ab ve the tracheal opening is not chain ed for a or 5 days then the gauze rolls are replaced and hell with adhesive plaster. The gauze dressin below the tracheal opening may be chain ed as often as necessary. After the fourth day the tube is kept out of the trachea is much as possible it is replaced if my tendency to swelling develops about the opening.

#### COMME/I

The wound above the tracheal openin as a rule heals nicely With this method the chance of primary healing between the skin and trachea should be the same as in the one stage operation There may be some drainage at the lower ex tremity just above the trachea The use of silk mattress sutures to close the skin at this point has been of great advantage Pharyngeal fistula following this method is very unusual. Althou h there is often a little leakage from the lower end of the wound the sinus tends to close gradually If a pharyngeal fistula does occur following the procedure it is usually small and obliterates it self on account of the median line incision Occasionally a few secondary statches are placed in the lower part of the wound in order to shorten the period of convalescence. I have not seen the serious infections of the neck with sloughing and secondary hæmorrhage or the large pharyngeal fistulæ that require flaps from the neck for closure such as are described following the one stage operation The two stage operation is used in cases in which the trachea has not been opened or obstructed If it is necessary to perform pre lummary tracheotomy it is made as hi h as possible so as not to injure the tracheal ring to which the skin is sutured later

NOMA OF THE LARYNY 1925 TO 1927



Fig. 9 Nephre tomy had been performed following laryn ectomy. Photograph taken lefore the patient returned home

There were 3 deaths following the first stage of the operation and none following the second stage in 4 cases (Table I) One of the deaths was the result of infiltration with procame of the tegion posterior to the lary na and trichea 4



Fig. 11 Large t acheal opening. The sit of the growth made it possible to save the lower two thirds of the cricoid cartilage.

method used in the earlier cases in the second stage as the patient could not swallow he aspirated secretions and death occurred from bronchopicumonia after 4 days. This region is now infiltrated in the second stage after the trachea is cut across. Paravertebral block aims thesis as used for the second stage has been used in the Mayo Clinic in 876 cases (the majority of

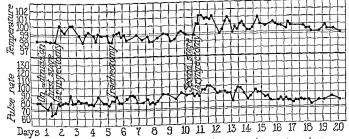


Fig to Temperature chart of the patient shown n F gure 11 Slight reaction from operation s shown.

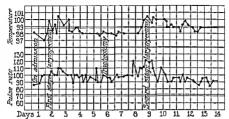


Figure o nd cat g the slight Tempetehtsptrthm tini m the try g t my

which have been bilateral) without injury to the pneumogastric nerves or other untoward results The second patient who died was a man 70 years of age who had cardiovascular disease the systolic blood pressure was 40 and the diastolic Death resulted from bronchopneumonia ing the first stage. The third patient following the first stage had a cough and slight bronchiectasis the surgical risk was poor Death occurred from bronchopneumonia after the first stage. If more care had been exercised in the selection of the cases the last 2 deaths undoubtedly might have been prevented

The points of interest in this method of larvn (1) the use of local infiltration gectomy are anæstbesia for the first stage (2) the median line incision and splitting of the hyoid bone (3) the creating of a barrier to infection by means of a clean wound (4) the opening of the tracbes later to infect the wound and allow the patient to immunize himself and become accustomed to the opening (5) the performing of the second stage of the operation under parayertebral anxisthesia and infiltration of the pharvnx about 8 days after the first stage (6) the complete primary closure of the wound of the neck without the usual drains or tubes inserting the split tube below the tracheal opening (7) the application of gauze rolls laterally on the neck with pressure to eliminate the space previously occupied by the larynx and to support the pharynx and (8) the primary healing of the greater part of the wound of the neck and a tracheal openin without the use of a cannula in practically all cases

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# A NEW METHOD OF INGUINAL HERNIORRHAPHY

WITH LIVING FASCIAL SUTURES OBTAINED FROM THE RECTUS SHEATH

By EDWARD M HODGKINS MD FACS Boston
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OR many years there has been a feeling of dissatisfaction among hermitomists with regard to any operation which involves the placing of catgut sutures under tension in muscle tissue. Nevertheless suture of the internal oblique and transplantation of the rectus muscle in the repair of inguinal hermia are being continued probably for the reason that no acceptable substitute for this most illogical procedure has vet been offered.

Kirschner's free transplant of hiving fascia lata to re enforce the suture line of the external oblique aponeurosis was undoubtedly a step forward in fascia surgery but is of limited advantage in hemiorrbaphy. McArthur utilized a strip of external oblique aponeurosis to suture the contoined tendon to the inguinal ligament but the amount of suture material from this source is definitely limited and its quality from the standpoint of tensile strength is always uncertain

The use of alcohol preserved fascial strips from the ox as advocated by Koontz constitutes a new surgical experiment which is receiving much favorable comment in the literature. It is yet much too early to reach definite conclusions on this method which is undeniably logical in its application and which can be yieved as a possible

solution of the suture problem

Russell and others have even advised that suture of the conjoined tendon to the inguinal ligament is entirely unnecessary and that correct treatment of the hermal sac is sufficient to effect a cure. This however has never been accepted as sound and the majority of surgeons still regard some form of suture as indispensable in the operation.

Galle and Le Mesurer have made the most important contribution with the recommendation that living sutures of fascia lata be used in place of catgut or non absorbable suture material They reported that their operations were satis factory in all details and presented 60 cases of both direct and indirect inguinal herina of which the majority were stated to be recurrent. None of their patients on careful examination showed any sign of recurrence after 2 years had elapsed This method has since been used by other sur geoms who report very favorable results. Coley

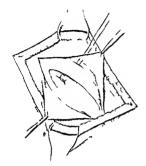
and Burke having used the living suture tech induce extensively call attention to the increased liability to wound infection experienced by them which seems to be the only adverse criticism of the method so far. The principle is surgically sound and the method will unquestionably remain in favor and gain many adherents. Galle and Le Mesurer who have conducted through and scientific investigation in animals to prove the value of himg sutures should be commended for these classical experiments.

In reviewing the hierature of the past to years on external herma of all varieties one is impressed with the number of modifications of old operations and the number of new operations that have been invented all with a definite trend toward utilizing fascia more effectively. It is probably now fair to state that subconsciously surgeons in general place little confidence in muscle plastics in the repair of hermal defects and we may anticipate that with further development in fascial suture technique they will evolve a dependable method of performing their favorite operations effectively

without any radical change

All of the commonly accepted methods in use at the present time involve three fundamental principles namely high and firm ligation of the sac closure of the defect in the abdominal wall by suture of the muscle aponeurosis or both to the shelf of the inguinal ligament and the narrow ing of the external abdominal ring It is further more conceded that all three of these principles are essential to any operation that is to be con sidered complete There is a large choice of such operations any one of which will prove successful (100 per cent of cures) if the reconstructed ab dominal parietes can be made to hold The future problem is therefore not which operation is best in a given type of hernia but what method of suturing in any of these well planned operations will hold the muscle and aponeurosis unyieldingly and permanently in place

Working on this premise the writer has a volved the operation of fascial weaving which is a living suture technique and in actual practice has satis fied all of the fundamental requirements for the construction of a firm barrier against recurrence I submit this report which is distinctly prelim



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nary with the hope that other surgeons will apply the method so that a large number of cases will soon become available for discussion

#### SKIN INCISION

The skin incision in unilateral hernia must be planned so that the entire width of the sheaths of both recti will be exposed To accomplish this it is well to begin the incision above the symphysis pubis to carry it directly over the external ab dominal rin just lateral to this point to start a curve upward and to continue parallel to and about 1 in habite the in unal hament inci ion i n t carried hi h but should end about 4 or 5 centim 1 is from the anterior superior spine of the drum It will be similar in shape to the bend in a li k v stick. When opened up with the flap reflecte | and retracted well toward the midline the increase vill give the desired expo sure of both rectu fascia and inguinal canal The semilunar in 11 n with convexity downward di rectly ov r | th external ring 1 the most con venient appr 1ch for bilateral herma. With either incision in ipr n like flap composed of the skin fat and superficial fascia can be reflected upward by a few strikes of the knife. In fact if the incision is first carned well down to aponeurosi blunt gauze dissection will easily separate in one

maneuver the loose areolar tissues attached to the flap from the underlying rectus and external oblique fascia

### EXPOSURE OF THE CANAL

The general plan from this point on of which the importance will be made clear by later description is to disturb the fascin of the external oblique and the internal oblique muscle as the about the fascin of the external oblique care is used not to strip the medial leaf too far back from the ed e of the internal muscle as the adherent fascia has valuable tensile strength. The lateral leaf is stripped back to expo e the shelf of the inguinal ligament in the usual manner. Barels to define the of e of internal oblique muscle and conjoined tendon grass sufficient exposure.

Isolation and dissection of the sac from cod structures is essentially the same procedure as that described in any standard text on hemia up to the point of treatment of the stump. In sisstep of the repair the writer prefers the method of transplanting the stump and a slight variation from the usual Kocher technique seems worthy

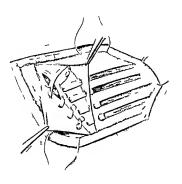
of description

The sac is opened and inspected and drawn taut. Under direct vision a non-cuttin needle cartying No 2 chromic catgut is passed through transitizing the middle of the sac. This is tied on one side and is then wrapped around and tied on the opposite side. The excess of sac above the tie is next amputated and a few more stitche are whipped over the top of the cut stump. A more secure closure is thereby obtained and the liability of br aking and re-opening of the sac as may, happen in simple li atton is eliminated. Both end of the citiqui suture should be left lon and should never be tied towether is a knot over

A finger is inserted up underneith the arching portion of the internal oblique muscle which is early separated from peritoneum. With sci sors a small aperture is mide in the muscle by the careful separation of the fibers in the direction of their course. With a suture carrier or ordinary hemostat the two ends of the catgut are grasped and drawn through, the openine and the stump of sac is pulled all the way throu h. Yerdles are no a threided onto the two ends of catent which are carried upward through the medial leaf of the external oblique aponeurosis is gentimeters apart and the above, the stump being drawn up to hilly beneath the, fascal laver.

the face of the stump may prevent firm adhesion

The kocher method of transplanting the stump of the sac just underneath the edge of the in



Fi 2 Steps in method of asving (2) Through bas of medial leaf of the e ternal oblique aponeurous (1) downward throu h edge of internal oblique (3) upward throu h shel importion of inguinal ligament (4) internal obliques as an pierced from above downward and continuing on loop needle is brought up through fascial strip it elf

ternal oblique muscle was a very important step in hermorrhaphy but the increased advantages of the method herein described seem obvious

# FASCIAL WEAVING WITH THE ATTACHED SUTURES RETLICTED FROM THE RECTUS SHEATH

Certain differences in anatomical relations be tween the fascial layers of the upper and lower rectus sheath would seem to offer difficulties to the use of fascial strips taken from this source Below the semulunar fold of Douglas the fascia of the internal oblique muscle ceases to divide at the border of the rectus muscle and together with the transversalis fascia passes entirely anteriorly A deficiency is therefore left in the sheath of the rectus behind This fact was thought at first to be a disadvantage as it seemed that the strips removed from the anterior sheath might lack at tachment at the border of the muscle and might not have firm enough anchorage at this point However such did not prove to be the case at actual operation The layers are held at the bor der by the general solidity of the fascial structure above between and below the area of removal of the strips with a degree of firmness quite suffi cient to withstand any reasonable amount of strain

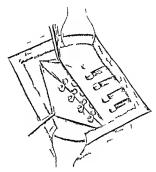


Fig. 3 butures has been drawn taut and fixed with lenen ties approximating muscle to inquinal lament Medial and lateral lea e of e ternal oblique aponeuro is preserved for imbrication | Knot indicate where stump of sac 1 anchored

The technique of the removal of fascial sutures from the rectus sheath requires but little descrip tion Parallel transverse incisions approximately 5 inch apart are made through the sheath be ginning at the lateral border of the opposite muscle and ending at the lateral border of the muscle on the side to be repaired The strip of fascia thus obtained has been cut in the direction of its fibers and therefore has the desired tensile strength Light strokes of the knife will facilitate the maneuver of separating the strips from mus cle The strips cut low near the pubis will be short on account of the narrowing of muscles at this point while those cut higher where the muscle broadens out will be conveniently longer It can be readily seen that this feature favors the suture requirements of the average hermal triangle which is narrower below where the conjoined tendon dips downward toward its junction with Gimbernat's ligament As a general rule not more than four strips will be needed even though the hermal triangle is large and the internal oblique muscle very much thinned out In the majority of cases three strips will effect a complete closure

A fascial strip is prepared threaded into a needle with a large eye and tied into the eye of the needle with catgut (Gallie technique) Each strip is woven into place as a suture before an other is cut

#### TECHNIQUE OF WEAVING

It issistep. The fiscial suture is drawn through the medial leaf of the external oblique aponeu rosis as close as possible to the line of surgical separation of the aponeurosis and the internal oblique.

Second step The edge of the internal obbque muscle is pierced from above downward and the suture is drawn through to the under side

Third slep. The strip is passed through the shelving portion of the inguinal ligament in the usual manner (from below upward) and is drawn taut

Fourth tep The edge of the internal oblique muscle 1 again pierced from above downward and is picked up just above the first point of suture

Tifth step Finally the needle is brought up through the fascal strip itself. The strip is drawn through and anchored securely at this point with a single tie of linen or No o chromic catgut.

When the suture is drawn taut in the third step the edge of the internal oblique muscle is approximated to the inguinal ligament without its being cut or undue tension exerted upon it This particular method constructs a firm loop suture with three points of eventual anchorage one at its attachment near the border of the rectus muscle another at the inguinal ligament and the third at the point where it is fixed to itself Many variations are possible such as the weavin back through the edge of internal oblique muscle slightly to one side of the first weave and then the fixing of the strip to the aponeurosis at another point Variations in the hermal triangle may suggest advantageous modifications of this sort to the operator

Although the writer has used the loop method of weaving almost entirely in the cases that have been done it is perhaps well to mention advisedly that the strips are adequate in length for any conceivable modification of the weaving

As soon as the necessary number of fuscal sutures have been woven through and fastened in place the fasca of the external oblique is ready for closure. This step in the operation also allows some choice. We may imbrieste the fascas by sewing the medial leaf to the inguinal ligament either above or below the cord with interrupted catgut sutures placed between the fascal loops and then by overlapping the lateral leaf and su turing, it to the superficial surface of the medial leaf. This is probably the better method of

closure as fascia to fascia cohesion is favored and a large proportion of strain is borne by this strong fibrous layer in direct contact with the fascial sutures. When too great tension would be extend on the medial leaf by an attempt to approumate it to the in_unial limament a simple and toomical closure is better.

#### DISCUSSION

Undoubtedly the least dependable step in in guinal hermorrhaphy as demonstrated in the recurrent cases operated upon has been the suture of the internal oblique muscle to the inquinal ligament The mechanical principle of the build ing up of a barrier against strain is correct but viewed from a histologic standpoint, the surmeal principle of suture is absurd. Livery case will show that the muscle has pulled away and re turned to a normal position so that at the most only a few strands of fibrous tissue are left to represent what was evidently a carefully done repair This consistent finding proves the met ficacy of foreign suture material in muscle under the tension and pressure of tying Chauke in 19 3 claimed to have proved expen mentally that muscle would not unite with fascia and they therefore condemned the usual opera tions for inguinal hernia Koontz in 19 6 con firmed these experiments but added that eroded or cut surface of muscle would unite to fascia Koontz's 1927 publication in which he recom mends the use of alcohol preserved fascial strips from the ox dispels the idea that the author retains much confidence in that phenomenon Further interesting and valuable evidence found in recurrent cases has to do with the union of the fascia of the external oblique. It is invariably firm and the line of suture can be easily traced by a great amount of fibrous proliferation Ap preciation of this fact has in recent years led to a revival of the Halstead Andrews Woolsey and Stetten operations which depend mainly upon fascia for support Strips taken from the rectus sheath and used as suture material in the deep muscle layers form permanent tendinous strands which will not cut through stretch out or break away from fixed points Pascia to fascia cohesion is histologically normal and can be depended upon to hold Fascial strips are therefore ideal suture To quote Gallie and Le Mesurier material

Over catgut and similar sutures they have the great advantage that they are not absorbed and that they continue for all time to perform the function for which they were originally intended

The fascial weaving described in this paper offers a method by which the internal oblique

muscle can be fixed either over or under the sper matic cord as may be indicated by the type of herma. The writer has used a modified Ferguson technique in most of the indirect cases and the Bassini in all of the direct cases, imbriciting the aponeurosis of the external oblique whenever possible. Indirect hermie of long struding and with thinned out muscles and a widely dilated triangle also demand a Bassini operation as a rule.

Complete hæmostasis a minimum of catgut ties and sutures avoidance of tension on tascin and accurate approximation of layers are features positively essential to the desired firm fascial union. Provided that infection and postoperative pulmonary complications do not arise and that there is no constitutional state which interferes with healing the result will be a solid wound and a permanent cure

Despite an experience with this operation too brief to warrant a detailed report at the present writing the following observations are submitted

### OBSERVATIONS

Fascial sutures reflected from the sheath of the rectus muscles are adequate in length and in ten sile strength for inguinal herniorrhaphy

Not being detached or unduly traumatized the sutures are surely living and have the advantage

of being bathed in normal lymph at all times even during the operation Since this method avoids the operation upon

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the thigh time is thus conserved and the chance of wound infection is minimized Pascial weaving does not cause muscle necrosis

since no tension or constriction is exerted

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# MUSCLE-FASCIA SUTURE WITH PRESERVED FASCIA AND TENDON

By MILLARD S ROSENBLATT M D TO MAURICE MILERS M D DETROIT MICHIGAN F m h B bl M m 1L bo y 11 p 11 p 1

In the repair of hering Mic Vithur was the first to use fa car for the suturning of muscle to the in until ligitiment. He derived his fascia from the external oblique fascia of the patient and used it is a continuous suture devia in, a special technique for anchoring, the ends. Gallie and Le. We urier have taken fascia that from the patient for use as muclef a cas and fascia fascia suture u in special needles and a special technique for anchoring the ends of the suture. They report excellent results as lid. Mac Vithur.

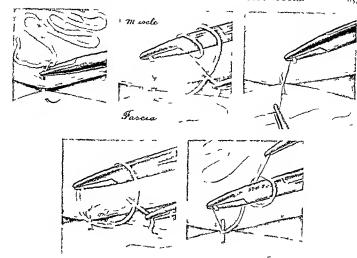
Koontz has u e l ox fascia preserved in to per cent alcohol as suture material for the muscle fascia suture and has employed a technique similar to that of Gallie and Le Mesurier | Koont had all o done muscle fascia suture with ordinary suture material to determine whether muscle unites to fascin. He was able to show that this does occur by a process of connective tissue union when fat and areolar tissue are previously removed from these tissues Posenblatt and Cook ev later and independently of tained the same results Seels and Chouke had been unable to secure this union Hertzler suggests that this difference in results depended on the f brin re action being transformed into connective ti sue in the cases in which heatures were tied tightly enou h to excite this reaction Koontz in com paring results with the fascia as suture material found even more firm union than with the ords nary material It was the work of Nageotte and Nageotte and Sencert on dead grafts that at tracted Koontz to their use in the repair of hernia

Nageotte had assumed that the fibers of connective tissue are met coagula that preservation in alcohol does not alter their state and that when grafted their will not cause phagocy tosis or foreign body reaction because they are implanted amona, mert fibers of the same kind Nageotta and Sencert had found in the case of so called dead grafts that (i) the texture of the tissues becomes attached to the grafted part by the in growth of fibroblasts (i) a vascular network is established and (s) it elead cells are carried way and replaced by hying cells from the tissue of the host

The experience of Koontz was in entire accord with that of Nagcotte and he felt that there was no absorption of the graft. Our experiments were suggested by the work of Koontz and of Nageotte

We used as suture material alcohol preserved ox fascia and tendon which were prepared as fol lows the material was taken from the animal with particular pains to prevent unnecessary handling or contamination of the material. The fascia and tendon were as soon as possible placed in 70 per cent alcohol Later under sterile precautions the areolar to sue was removed by scalnel and the tissue cut in strips 8 to 10 inches long and 28 inch wide These strip were then placed in a second par of 10 per cent alcohol and allowed to stand for at least a week. Anaerobic and aerobic bacteriolo ical tests were made on nutrient broth media and in each of the four trials a pure culture of the hav bacillus was found Experiments are now bein conducted in an attempt to eradicate this bacillus from the material \o infection of the animals oc curred With this material an ordinary five eighth curved round needle of moderate size and with a large eye could be made to carry the suture The suture did not need to have the end tied of sexed to prevent fraying. In using this suture material no special or unusual technique of anchoring or splicing the sutures was necessary for they were placed as individual single sutures It was found that becau e of the nature of the material it could be tied more easily with the instrumental technique which we have shown in Figure 1 The end were cut off rather longer than necessary and placed in the groove formed by the muscle and inguinal ligament which had been sutured together

In our experiments it was decided to adopt a shightly different method than was previously employed in order to suture muscle to fascia under very severe tension and in order to test more adequately what could be expected in the way of union if this undesirable factor was pres ent In the dog an inguinal incision of , inches was made The external oblique fascia was incised and The anterior sheath of the rectus reflected muscle was incised at the lateral edge of the muscle and a portion of the sheath resected This incision of the sheath allowed the internal oblique mu cle to fall laterally and to allow a The edge of the bulge of preperitoneal fat rectus muscle was then sutured under tension to the reflected edge of the external oblique (Pou



Fi r Muscle and fascia placed ir apposition b o fascia sutur carried by an ordinary curved round nee lie

Instrumental method (f tvin 15 maie desirable by type of sutu e material b ed

part's ligament) by single sutures of fascia or tendon the arcolar tissue first being carefully removed from muscle and ligament. All the sutures were placed above the internal openings of the cord. (See photographs and drawings of specimens so sutured and the normal anatoms for comparison.) The fascia of the external oblique was then resutured and the skin closed both with catgut.

On everal animals tendon was used on one side of the animal and fascia on the other. In one case an autogenous fascia derived from the rectus sheath itself was used. This latter case as well as all of the cases in which dead fascia was used as the suture material showed very firm union of the muscle to the fascia the autoginous being no firmer. It was our impression that the union was even stronger than in our previous experimental work (Rosenblatt and Cooksey) in which the fibrous suture material had not been used. The union was ostrong that it would successfully resist forcible attempts to tear it aprit. We found the tendinous material

much more difficult to handle at the time of operation because of its inclusticity and harditess and it was much more bulk, in the tying of knots. It also traumatized the muscle in several cases a feature which was not noted in the case of the fascia sutures. The results of the union with the tendon although good were not nearly as good as with the fascia. We therefore feel that the latter is much more desirable for this work.

At autopsy the suture material was evident. The fassia was apparently smaller in dimension than when introduced into the tissue and in several instances seemed very markedly smiller. There were dense fibrous growths between the suture material and the muscle and Poupart's ligament just as between the muscle and the ligament. The tendon on the other hand did not apper it to be any different in size than at operation and the fibrous ingrowths were not nearly so marked. It will be remembered that it was previously remarked that the tendinous material was too bulky inelastic and dense for the most satisfactory use in this work.



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Fi 6 Photomicrograph (low power) taken 60 dix after operation and show n union of mu cle to aponeuro 1 by means of connective t sue around the muscle f bers and bundles Ov fascia suture was used

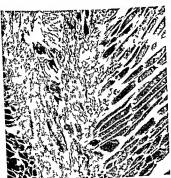


Fig 8 Photomicrograph (low power) of ox fascia suture through the rectus muscle show ng the same type of un on as in the two previou plates There was a slight foreign body reaction in the center of the sutu c



Ti 7 Photom crog aph (hi h power) of same area as in Figure 6 showing cell of v hite connective tissue sur rounding muscle there continuous with those of the aponeuro is—a true connective tissue union

Microscopically the fascia and tendon grafts had excited some foreign body reaction but practically no round cell reaction. Dense fibrous tissue attachments to the muscle and the fascia and between the latter two elements could be demonstrated the connective tissue cell having invaded the graft and connected with the endomy sum and perimy sum (connective tissue) of the muscle. There was a very marked vascular

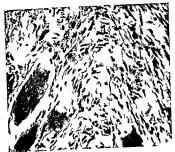


Fig 9 Photomic ograph (high powe) at one edge of the un oo sho vn n F gure 8

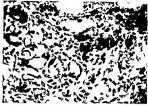


ization of the grafts with tremendous proliferation of the capillaries. It seemed that the fascing graft had acted as an element for substitution of living torollasts and had also been in part absorbed. This also option and foreign body reaction is opposed to the previously mentioned views of other observers.

For clinical purposes we feel very strongly that the use of fascia sutures either living or preserved is not indicated in the ordinary union plicated and not unusual herrire. The results are quite satisfuctory in most hands by any one of several techniques. We do feel however that



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there may be certain cases in which very large defects are present cases with poor musculature or recurrent cases that would offer much greater hope of cure and satisfactory repair if fasca sutures were used. We feel that the preserved fasen sutures offers as good repuir as possible and is without the inconvenience of requiring a see ond incision for the purpo e of obtaining autoenous fa ca material. We have found the method of phreing sutures used herein to be very practicable as it requires no special equipment and is rapid and sumple.

#### CONCLUSION

r Preserved or fascia in muscle fascia suture used in hernia cases gave very excellent union
2 Pre erved or tendon was not so satisfactors

in result or in the handling

3 It appeared that the fascia graft acted as an element for substitution of connective tissue and was in part absorbed. There was some forci n body reaction.

4 We have used this suture material as a single suture and tied by an instrumental method

single siture and fied by an instrumental memora

We do not recommend the use of this fascia
suture except in cases of involved or difficult
hernice as we feel that ordinarily its employment

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# AN OPERATION FOR ANKYLOSIS OF THE HIP JOINT

BY LERCY WILL AND ROBERTS M.D. FACS NEW YORK F mth Sec dOth pd D Hospilf th Rpi d dCppld

Thas lon, been my impression that all of the operations devised to produce ankylosis of the hip in chronic osteo arthritis are unduly elaborate and require an unnecessarily long period of hospitalization. To overcome these ob jections I have planned a procedure based on the slot and key principle adopted by mechanical engineers in attaching a wheel or gear to a revolving shaft which theoretically at least would produce results with less effort on the part of the surgeon and with considerably less expense to the patient

An opportunity to put the procedure into exe cution did not ari e until November 1927 when a laborer 54 years of age was admitted to the Hospital for the Ruptured and Crippled with an Osteo arthritis of the left hip Notwithstanding the fact that he had only 10 per cent of normal function in the joint he had for several years worked on the docl s as a stevedore until increas ing pain compelled him to stop work. His was obviously not a case for arthroplasty the popular method of treating chronic painful hips because the time element was an important factor and the man had proved that he could earn his hving with a practically stiff hip if pain could be elim

mated It was therefore decided to attempt the newly planned operation and the results were eminently satisfactory

The technique was as follows Through a Smith Petersen incision the upper posterior sur face of the acetanular overhang was freely ex po ed A tapered block about an inch square on its superior aspect was cut out (Fig 1) and put uside in salt solution. The lower extremity was then placed in the desired position of 15 degrees abduction without rotation of the foot and wis held in this attitude by an assistant. The tapered opening in the acetabular rim was then extended downward into the head of the temur care being exercised to maintain the slope of the sides of the

The block of bone removed from the acetab ulum was then denuded of its articular cartilage and driven with force into the bed prepared for it thus mechanically blocking any movement of the temoral head and bringing the lateral and in ferior surfaces of the graft into intimate contact with the raw surfaces formed on the acetabulum and the head of the femur (Fig. 2) A plaster spica was applied without fear of altering the relations between the graft and its bed as the



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joint was securely locked against motion in any direction

Convalescence was uneventful. At the end of

7 weeks the patient was discharged still wearing a spica. Three weeks later the cast was removed at home and the patient came to the hospital in the subway the hip joint having become firmly ankylosed and the pain ha ing been entirely eliminated.

In view of the relative simplicity of this operation the comparatively short time of hospitalization and the excellent result obtained the pro-



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cedure is offered as a practical means of securing surgical ankylosis of the hip joint because it has some advantages over methods heretofore de scribed

## RESULTS IN PORTO RICO OF KONDOLEON OPLRATIONS FOR ELEPHANTIASIS OF EXTREMITIES

BY GARRA R BULKE ALD I ACS SAN JUAN LORGO RICO Th P lyt II pt1

THE word elephantiasis has always given the Impression of being a tropical disease and rightly so Nevertheless the reported sur ery of elephantiasis has been for the most part one in the temperate zones. In fact the operaon that engages our attention in this paper ngmated in Greece which is about 38 degree orth latitude Porto Rico at 18 degrees north atitude well within the torrid zone should there ore present an interesting situation for th urgical study of this so called tropical disease nd for this reason the results in a small series f cases are presented although they are some shat at variance with the results reported by our orthern colleagues

Among 19 000 patients admitted to the Presby enan Hospital San Juan Porto I ico since 1905 there were 53 easts of elephantiasis of the lower extremities Of these cases 35 have been operated upon The remainder have either re fused operation or have been treated medically Of the 35 cases operated upon 16 had typical kondoleon operations either on one or both sides of the leg 6 had questionable Kondoleon opera tions (to be explained later) and 11 had amputa tions either below or above the knee One patient was operated upon in August 1912 and the warty growths of elephantoid tissue were shaved

Fig 1 (left) Elephantiasis Amputation wa finally Fig 2 A front view of the same leg as illustrated in Figure 1

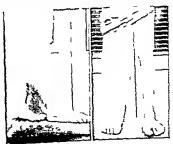
1 ig 4 Sa ne case as slown in I igure 3

off and the raw surfaces dressed with oiled silk In one case a Kondoleon operation was not com pleted because of hemorrhage. There has been one operative death in a patient following, an imputation

As defined by Matas (10) elephantiasis is a progre sive histopathological state or condition characterized by a chronic inflammatory fibro matosis or hypertrophy of the hypodermal and derin il connective tissue which is preceded by and issociated with lymphatic and venous currents in the affected parts Many operations have been devised to relieve this deforming and disabling conduct as these limbs frequently attain an enormous size and make walking almost im possible

In a review of the operations to date at was found that the first operation that of ligating the main irtery to the limb was proposed by Car rochan in 1851 and resurrected by Hutter in 1808 Obviously the results of this operation were not

encouraging Kuzutzoff (1905) Vikulice von Eiselsberg Kafoni and others have tried the effect of mul tiple cunciform excisions of the diseased skin and underlying fibromatous tissue. The results have been favorable in a certain number of reported

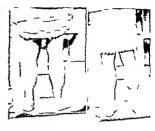


Ing 3 (left) Eleph ntias s in a boy 3 years old Kondoleon op ration as attempted but I ad to be sto ped becau e of se ere hamorri age



Probably 3 of the cases that I have classed as doubtful Kondoleon operations had this type of operation. Two were performed in 1000 and one in 1910 kondoleon described his or era tion in 1912 The recor is of these three opera tions state that strips of skin and subcutaneous tissue were removed but no mention of the deep fascia is made. The patt nt operated upon in 1010 was seen April 28 10 7 She had obtained some relief in the area operated upon but the in cisions had only been carried to just below the knee and from there on up to the thigh the disease had progressed as well as in the other leg and attacks of lymphanguis had occurred frequently in both legs. The left calf or leg operated upon then measured 18 inches in cir cumference while the right calf in which the disease had developed since operation measured o c inches

In 1 )08 Sampson Handley (1 proposed draining the obstructed areas into healthy tissue This he ic ompli hed by inserting long threads of unab orbai le silk which tunnelled the border line letween the a lematous and normal tissue He place [ 4 or 5 | ilk threads in the subcutaneous cellular to us of the affected limb throughout its len th (fr m the wn t to the chest will in the upper extr mity and from the dorsum of the foot to the ab lominal wall in the iliac region in the lower extremity) Varied results were reported It vas soon found that these foreign bo lies pro voked an overgrowth of tissue around them and functioned as a dam rather than as a dram in some cases. In summarizin the results of the operation Handley himself says To my mind



h min I gu e

lymphangioplasty has failed to establish its position in the treatment of elephantiasis

In 1006 Lanz (8 o) of Amsterdam workin on the theory that only the superficial lymphatics are blocked attempted to establish a communica tion between the superficial and deep lymphatics in order to relieve the condition. He proposed an operation which included the opening of the fascia over the thigh dissection through the muscle down to the bone trephination of the bone in three places and the running of strips of fascia through the muscle down to the bone. The result was excellent and 3 years later the patient was in good condition. The technique of this operation is somewhat difficult and Lanz himself later doubted the necessity of trephinin, the bone

Kondoleon (6 7) of Athens Oppel (11) of St Petersburg and Ro anow (12) of Moscow modified I anz s procedure slightly Leeping the principle of drainage of the superficial lymphatics through the deep lymphatics in mind In 191 Kondoleon publi hed a description of the opera tion that we now use and reported very sati factory results in 6 cases. The operation consists in the removal of a strip of skin and subcutaneous tissue together with the deep fascia from one or both sides of the le, from the thi h to the ankle the rent in the deep fascia being left open and the skin and subcutaneous tissue sutured over the muscle

Matas (10) and Gessner have reported case of Kondolcon operation in which very good re sults were obtained Matas (his patient was the wife of a physician) did the operation on both sides of the leg at the same time. The procedure resulted in the loss of the leg in one of our cases which I will subsequently mention Gessner's operation was done on the outside of the leg only and improved the circulation so much that old indolent ulcers on the inside healed readily following the operation. One of our cases of amputation was for an ulcer occurring at the site of a Kondoleon operation done elsewhere 6 months previously.

Other cases of the Kondoleon operation have been reported by Hill (5) Royster (13) Herff (1) and Sistrunk (14 15) Varied results have been obtained by these men but on the whole the results have been more or less stitisfactor. It though the condition has not been cured it his either been improved or held in check in the majority of instances. The largest number (6 cases has been reported by Sistrunk who in 192 reports 40 patients 30 of whom obtained good results and 10 of whom were improved. He suggests operating the second time in fact states that he has operated upon several patients who had been unsuccessfully operated upon hy other surreons.

In the years 1915 to 1927 16 hondoleon operations were performed in the Presbyterian Hospital San Juan Probably 2 of the 6 doubtful kondoleon operations already mentioned were of this type but since no mention is made of the deep fasea in the record of the operation these

cases are not included in our series

It has been the policy to put these patients to bed for a few days before operation with the leg slightly elevated to allow for as much natural drainage as possible. Since 1919 one side at a time has been operated upon and where more than one strip was to be removed the external strip was removed first and the internal strip last as the internal saphenous vein is ultimately destroyed and it is well to preserve it as long as possible. After operation the wearing of a rubber stocking is advised. It should be put on each morning before the patient gets out of bed.

In the 16 known cases plus 1 case in which an universely at attempt at a Kondoleon operation was made what have been the results? End results in 12 of these 17 cases are known As mentioned before 1 patient who was operated upon in June 1919 had the operation done on both sides of the leg at the same time and de veloped a gangrene because too much tissue was removed and because the sultures were too tight. The leg finally required amputation above the

lnee one month later

A second patient with elephantiasis involving the foot principally and extending up the leg

about haliway to the knee was operated upon September 8 to 1. A typical kondoleon operation was done and the incisions extended from the head of the fibula to the toes. There was primary union of the wound and the patient was relieved of pain but there was no reduction in the size of the foot when the patient was discharged from the hospital 35 days after the operation. This patient has not been seen since

1 third patient a boy of 13 years since birth had had an enormous elephantiasis of the right leg extending from the hip to the ankle and measuring 14 inches in circumference above the knee and o inches at the calf He was operated upon December 13 1923 after 40 days of rest in hed with the leg elevated The operative record Kondoleon operation attempted and in ci ion outlined Dissection of flap started just above knee on lateral side Tourniquet applied by two different people to thigh above incision luled to suppress circulation and venous sinuses bled profusely Attempts to place artery elamps unsuccessful as tissue was so hard Flap dis sected down about one quarter of distance when patient's pulse jumped to 180 and grew very Operation stopped and wound closed drawing edges together in upper angle but closing the parallel meisions as such in the lower three fourths of leg Rubber tissue drain in upper angle of wound Six hundred cubic centimeters of normal salt solution given intravenously Patient left operating room with good color with fast weak pulse. This boy was last seen on March 1 1928 At that time the elephantiasis was practically the same but he had had no recurrence of the attacks of lymphangitis

Sistrunk calls attention to the incidence of shock in these operations but he places hismor rhage in the second place in its causation and extensive injury to sensory nerves in the first place. The shock in this last case seemed to be

due primarily to the hemorrhage

Gue printarily to first services

CESE I No 12208 M B Gurabo female 35 years
old was admitted September 26 1922 She had had ad
vanced elegantasis of the right leg for 16 years with no
history of lymphangit On October 4 1922 after the
history of lymphangit On October 4 1922 after the
patient and rested in bed for 8 days a kondoleon opera
nous performed on the outer side of the ler and on
October 19 on the inner side The immediate result was
promise union and the patient was discharged on October
38 192 (5 years I te) at 5 00 p m after doing I undry
nt Ail day Before operation she had never had any
attack of fever but at that time she was having one every
30 of 4 months. The leg was becoming larger with each at
tack although she had not not ced any redness of the leg
during the attacks. She had never worn a rubber stocking
because of the expense. Measurements showed the leg to
be about the same suze as before operation.

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TABLE I MEASUREMENTS BEFORE AND AFTER OPERATION

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ing operation he had had no such attacks. Thin fir a period of a year he had 3 or 4 attacks an 1 f r the la t years had been free from attacks. He and that hurm the day while he worked as an oiler in a cigar fa tory by les. swelled but that the swelling went doon ne t ni it He had worn a rubber stocking continuou is and filt little leg although somewhat larger than when | 1 ft ti 1 pital was still about half the size that it will it

CASE Q No 18600 M C Agua lilla femal 4 y r of age was admitted October 18 1927 She hilha im rl 1 elephantiasis of the left left for rayear but the had! no fever or lymphanentis On O tober 3 aft the ittent had rested in bed for 6 days a Kon lol on 1 r to wa done on the outer side of the left le tle n tend n from above the knee to the ankle. The of was repeated on the inner side of the leg on No the increases extending from the mid thigh to the 1ki Som shock followed the econd operation and c the intravenous admini tration of 300 cul ic entim to normal salt solution. The vound healed by ir n re union and the patient was discharged on \ne it r in an improved condition. On April 15, 325 6 m ntl later she wrote that she had been waring a rulle t link and that the swelling of the leg was preatly eluel nd the result satu factors

A brief of these I cases is as follows I Kondo leon operation with immediate amputation i Kondoleon operation—there was marked involve ment of the foot which was no better at the time the patient was discharged from the hospital a attempted Kondoleon not finished becaute of hamorrhage I Kondoleon-the condition is worse now (5 years after operation) than before operation 2 kondoleon operations—the condition is now (11/2 and 3 years after operation) the same as before operation I kondoleon -the condition is somewhat improved the patient does not wear a rubber stocking 5 kondoleonsthe condition is markedly improved all of the patients wear rubber stockings

#### SUMMARY

I The operative risk for the limb is greater when both sides of the legs are operated upon at the same time The greater safety to the patient would seem to justify the two stage operation

2 Cases in which the foot as well as the leg is involved give poor results even when the in

cision is made down to the toes

3 If the subcutaneous tissue is extremely hard very troublesome hamorrhage may develop and

materially increase the danger of shock 4 The periods between attacks of lymphangi tis are lengthened in the majority of the cases In one of our cases the attacks disappeared al together for a period of years while one patient developed attacks of lymphangitis after operation

- 5 Social status plays an important part in the end results I itients who work on their feet many hours a day have poorer end results than do those who are not compelled to do hard manual labor
- 6 A rubber stocking worn during the day is a great aid if not an essential feature in combating the return of swelling following operation for cluphantiasis
- I esults in Porto Rico for the Kondoleon operation for the cure of elephantiasis have been chscouraging

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#### TRACHEOTOMY TECHNIQUE AND AFTER-CARE OF THE PATIENT

By WILLIAM II II IOLEAU M D CEPTELIND O 10

THE rare indications for tracheotomy have been described in a recent paper. Once decided upon there should be no delay. The patient should be kept unaware of the plan until all preparations have been made, and he should then be told simply that his difficulty in breathing will be releved by a minor procedure. It is much better for the patient and just as easy for the sur geon to have the operation performed in the patient's groom.

I he patient r quiring tracheotomy is often in a critical condition and must be given every consideration A congenial anaesthetist should be pres ent to talk with the patient and to cover the eves with cold compresses. An inhalation arresthetic even though it were desirable is out of the oues tion on account of the lary ngeal obstruction If time permits the operative field should be infil trated thoroughly with a 34 per cent solution of no ocain but in an emergency this may be dis pensed with The patient should be inclined at an an le of 45 degrees The neck should be straight or slightly extended. To extend the neck fully may cause a complete laryngeal obstruction and thus necessitate great haste in performing the operation

If the patient has recently had a thyroidectomy or other operation in the region of the trachea the skin ed es should be separated for a distance of from 4 to 6 centimeters in the middle of the neck and the lower sutures should be removed from the fascia and the ribbon muscles thus exposing the trachea If the patient has not had such an operation a transverse skin incision from 4 to 6 centimeters in length should be made in the mid dle of the neck on a line 2 or centimeters above the sternoclavicular junctions The skin edges should be dissected free from the fascia both up ward and downs ard a longitudinal incision made in the fascia and the ribbon muscles separated in the midline If it is not possible to expose the trachea well below the 1 thmus of the Ihyroid gland then the isthmus must be resected If time permit complete hæmostasis should be obtained by means of fine plain catgut otherwise gauze packing should be employed Once the trachea is exposed the neck may be safely ex tended

The most favorable site for a tracheotomy is between the fourth and fifth or between the third and fourth tracheal rings. A low tracheotomy is more comfortable and heals more quickly while a high tracheotomy may cause permanent injury to the larynx A transverse incision between 1 and 2 centimeters long should be made between the two rings the edges of which should be held apart with a small forceps while the tracheotomy tube is gently and deliberately inserted. The obturator should be removed at once At times it is well to let the patient take several breaths through the opening before the tube is inserted. Before the trachea is incised the patient should be told that he will breathe through a lower openin and will be unable to talk for the time bein At this stage the patient should cough out through the tube any accumulation of mucus or blood that may be present A suction machine is often of great assistance When the patient has grown quiet and it is seen that there is no bleedin a small strip of gauze should be loosely nacked around the tube at its entrance into the trachea and the inner tube inserted. The muscles and fascia above the open ing should be approximated in the midline with interrupted sutures of catgut and the skin edges should be approximated leaving just enough room for the tube and the packin The dre sing is made by cutting a slit half its breadth in the center of a rectan ular piece of gauze and apply ing it so that the edges of the slit fit under the flanges of the tube thus leaving the opening uncovered

Tollowing a tracheotomy except for the first few deep breaths the patient generally breathes queetly. However if considerable morphin has been given not uncommonly he ceases to breathe and becomes exanotic. In such a case artificial respiration is almost invariably effectual.

The operating tray should be removed before the patient s eyes are uncovered. The surgeon should then reassure the patient and explain that the tracheotomy was done to releve a temporary obstruction in the larry nr analogous to that caused by diphtheria in children. The patient may be further reassured by placing a linger over the opening in the tube on exhalation thus enablin limit to cough and talls. After he has been thus reassured the patient usually sleeps quietly for several hours.

Th Impotant 1 acheom Sg Gy ec & Obst 9 \$

In no other type of case is the patient so de pendent upon the constant and expert attention of the house staff and nurses as after tracheotomy In addition to the fact that a patient v ho has to have a tracheotomy is in a poor physical condi tion he is generally apprehensive. He is very quick to learn the expert touch and without it loses ground rapidly. Às a rule he should never bo left alone for the first 48 hours or often for a longer period. The temperature of the room should be moderate Tents over the head of the hed are unnecessary and only give a sinister appearance to the scene A pitcher of steaming menthol solution at the side of the bod often gives comfort, but hot inhalations seem to increase mucus formation and thus are undesirable. The patient is generally most comfortable on his back in a semirecumbent position but he should be turned from side to side at intervals It is well to insist upon his taking several deep breaths every hour while he is awake as this may tend to prevent the develop ment of a pulmonary atelectasis which is a com plication that must be guarded against in this type of case

A piece of gauze should always be kept on the patient's chest so that when mucus is expelled it can immediately be wiped off the end of the tube and will not be inhaled. The inner tube should be removed as often as is necessary to keep it clean and this can be done without disturbing the patient. If this is neglected the tube will soon become obstructed with tenacious mucus or blood.

Some patients have very little mucus while others almost drown in it Some are able to expel it through the tube while others are unable to raise it as high as this In the latter type of case an aspirating machine is absolutely necessary This machine should have a strong but silent electric motor to which is attached a soft rubber catheter preferably with a whistle tip If the tracheotomy tube is size No 4 or smaller it is well to remove the inner tube before the catheter is inserted The catheter should be large enough to permit mucus to pass through it fairly easily however not so large as to prevent the patient s breathing around it when it is in the tube It is generally sufficient to insert the catheter as far as the lower end of the tracheotomy tube since the patient can readily raise the mucus as high as this Only rarely in case the patient is very weak is it necessary to insert the catheter as far as the bifurcation of the trachea This should not be done too often as it irritates the trachea and pro vokes an exhausting spell of coughing It is well to aspirate the larynx occasionally through the

mouth Water should be aspirated through the catheter at frequent intervals to keep it clean Care should be taken not to allow the receiving jar of the michine to become too full as fluid will be sucked into the pumps and this will put them out of commission

An extra tracheotomy tube should always be at The gauze packing should be changed every 8 hours or oftener depending upon the amount of oozing from the wound Mild antiepties may he used but strong ones are contra indicated as they may seep into the trachea and A tracheotomy wound must cause irritation ilways be considered as infected however if it is kept clean the infection is of little significance On the other hand if it is neglected a very troublesome putrid infection is apt to develop Such an infection is very difficult to treat both on account of the opening in the tracher and the irritability which prevents much manipulation A considerable amount of necrotic tissue develops which must be carefully cut away. Chief reliance must be placed on the mechanical cleansing dichloramine T if used with care being very satisfactory

The degree of the laryngeal obstruction can be determined quite accurately by occluding the opening of the tube or better by removin, the tube and occluding the opening in the trachea and further information can be obtained by a visual examination of the vocal cords If possible the tube should be removed within 3 hours how ever if there is any question it is better to leave it in longer If removed early the opening can be closed with a single fine chromic catgut suture in the overlying tracheal fascia and in this ca e the remainder of the wound may be clo ed except for a drain down to the trachea but if the tube has been in for more than I hours the suture will be of no avail In such a case the opening should be occluded with gauze packing of sufficient size so that it can not be drawn into the trachea on inspiration This should be changed every 1 to 3 hours as it soon becomes saturated The wound should be kept scrupulously clean Granulation tissue grows rapidly and in from 10 to 12 days the wound will be completely healed Factors which influence healing are the height of the opening the degree of intection and the length of time the tube is in place. In some cases even after the tube has been removed the opening will remain and the patient is dependent upon it for part or all of his air supply This is the most difficult type of wound to keep clean

Generally the scar is very little larger than it would have been if the wound had healed per

primam. However if it is unsightly and trouble ome a plastic operation may be performed but it is better not to uttempt any plastic work until a vert has clap ed. The scrt may then be exeised and the muscles freed and approximated in the midline over the truchea. The result is very satisfactory.

If tracheotomy is performed in a cale of severe hyperthyroi lism the nationt requires a great deal of water and nouri hment. Not infrequently in such a care there is an associated pharyneeal paresis v hich caus s choking upon any attempt t swallow. It is unwise to urge the patient to st allow as the ch king is very exhausting and the a riration filluid into the lungs may cause pneu monia Some rationts are able to swallow thick hourds fairly well while others choke on any thing it is the latter type which pre ents a serious problem—how to give sufficient fluid and nours h ment vithout unduly di turbing the patient Water can be given by hypo lermo lysis but this l ecome painful if kept up for several days a hile the amount of nourishment that may be given by int avenous methods a greatly limited by the no ir canditi in of the heart and also by the lan ger of a chill if it is given in any amount rivery often Proctocly is is not ri usly ineffectual in this type of case Gastr stomy veuld be satisfa tery but it is too radical a price lure

The method of choice 1 to insert as it rubb r tube size 10-14 \( \text{T}\) into the \( \text{t}\) mach through the mouth or preferably but with more difficulty through the gose. This generally has to be done

under direct vision as the tendency i for the tube to enter the lary ny This tube should be left in until the patient can swallow around it Care should be taken not to insert it much beyond the cardia as otherwise the end will become linked and obstructed The tube is less ant to be annouin than hypodermoclysis or an intravenous in tection and in the few cases in which it has been necessars we have not seen one in which it could not be used to great advantage All fluids and nourishment and most medicines can be given through the tube though care should be taken not to overload the stomach as in this type of case the patient is frequently nauscated. Fluid can be injected into the tube every hour even while the patient is sleeping. The tube can gen erally be removed in 3 or 4 days. If a patient who has had a tracheotomy performed is goin steadily down hill he often improves rapidly once the tube has been inserted and he receives sufficient nourishment

nourshment
As soon as the condition of the heart permits
the patient should be allowed to be out of bed as
this has a very beneficial effect upon the psychic
state. He no longer considers himself diangerously
ill A man should be shaved and a woman
allowed to u e the cosmetics to which she is
accustomed. Patients should also be allowed to
substitute their own clothes for the regulation hes
patal garb. In encouraging surroundines and with
good care these patients get along remarkably
well. Only rarely does a patient die from a con
plication following trachectomy.

## SOME HISTORICAL NOTES ON THE TECHNIQUE OF CÆSAREAN

BY LOUIS I PHANCUE MD FACS BOSTON Dp tm t f Gv lev dObtt f Gv ec l gv T ft C ll g M d 15 h 1 Ch f fS

AESAREAN section is the removal of the child through an incision made in the abdominal wall and uterus The term is not applied to the extraction of the child from the abdominal cavity after the uterus has ruptured nor to ectopic gestation

The term cæsarean section is probably de rived from the latin partus casareus from cadere to cut A better term however is abdominal hysterotomy but despite this the term casarean section is used throughout obstetrical literature. There is no reliable evi-

dence that Julius Casar was delivered through his mother's abdomen Furthermore cæsarean section on dead women was performed long before Casar's time. It is noteworthy that at this period the operation was never performed on living women and Casar's letters to his mother

during his wars prove that she was alive

The operation on the dead woman is referred to in the myths and folklore of European races and was probably performed by the early Egyp tians It is stated that Dionysus was cut from the dead Semele The Lex Regia of Numa Pompilius 715 B C expressly orders the remov al of the child before burying the mother. The ancient Jews gave the name of Jotze Dofan to children delivered through the abdomen of the mother. In the year 1870 Felkin saw a native in the heart of Uganda perform a cæsa rean section and his description of the operation is interesting in the light of the crude attempts at anæsthesia and antisepsis Banana wine served the purpose of both the patient being drunk with it (bibation anæsthesia) and the operator washed his hands and the field of operation with it to sterilize them. He opened the abdomen and uterus by a quick incision the cord was cut the placenta removed the cervix dilated from above and the uterus massaged until contracted The peritoneal toilet was accomplished by lifting the patient. The operation was completed by closing the abdomen with pin and figure of eight sutures and the wound was dressed with a paste of crushed herbs. It is stated that the temperature remained below for degrees  $\Gamma$ and that the wound was healed in II days

Looking further into the history we find the first generally accepted cæsarean section v as per

formed in 1610 by J Trautmann of Wittenberg on a woman with hernia of the gravid uterus Somewhat earlier | Nufer of Switzerland a swinegelder by occupation is said to have delivered successfully his own wife by this method when several midwives and barbers had given her The mortality in these early days was frightful and the operation was done only on women who were already doomed. Rousset's monograph played no small part in bringing to the attention of the profession this procedure which was so bitterly opposed by Europe's best I nown accoucheurs The operation of symphy siotomy devised by Sigault was at that date the greatest competitor of crearean section

In reviewing the statistics kayser of Copen hagen in 1814 found a mortality of 62 per cent for the previous 80 years larnier is said to have made the statement that in Paris up to his time no woman had survived the operation during the nineteenth century Spath recalled a similar experience for \ienna in 1877. In the United States Harris collected 80 cases and these showed a mortality of 52 per cent the fatal cases resulting from hamorrhage and infection Although Lebas in 1760 had put 3 stitches in the uterus and left the ends long so that they could be removed it was not until 188 that Stenger described his method of suturing the uterus In 1877 Porro of Pavia had recommended the supravaginal amputation of the uterus after delivery in order to overcome the two serious complications namely hymorrhage and sensis This radical method so improved the results that it was instrumental in preventing the conserva tive cæsarean section from developing into the comparatively safe operation which it has become Saenger's technique was responsible for deter mining the indications for the more radical method namely an operative procedure to be used only in the presence of a definite indication for sacrificing the uterus

#### FIRST CONSIDERATION OF C ESARCAN SECTION THE LIVING CHILD

The first consideration of cæsarean section was the hving baby. With this in mind the early operators insisted upon speed for they felt that the sooner the child was born the better were its chances of living Those were the days of spec tacular operating when not infrequently the abdomen and uterus were opened with one sweep of the knife Unfortunately accidents resulted such as cutting a loop of intestine which might inadvertently have floated in front of the uterus Again babies were injured by the too deep pene tration of the knife in the uterine wall

These accidents as well as other factors have shown that time is not the only element which enters into a successful operation. Reflection on the duration of general anæsthesia in an ordinary forceps delivery might have su gested that undue emphasis was laid on the need of shortening the time of anasthesia. Other factors affecting the child a welfare are the administration of morphia too soon before starting the operation and the re ulting intra uterine asphyxia trauma to the child by attempting delivery through an insuffi ciently lon, incision and disturbance in the child s nutrition in the presence of a prematurely separated placenta and placenta pravia Pro longed anasthesia as a result of the too slow extraction of the child is rarely a factor in the hands of experienced op rators

#### SECOND CONSIDERATION OF CESAREAN SECTION THE WELFARE OF THE MOTHER

Finally the velfare of the mother vas given more consideration when it was discovered that a living baby could be obtained easily and that with the early technique the results to the mother were generally serious and often disastrous

To what dangers or disabilities is the mother exposed when the child is delivered abdominally? These may be clas itsed as either immediate or

late dangers

A Immediat dance I Hamorrhage While in the early days of cusarean section hamorrhage was one of the greatest dangers this has now been so minimized by proper methods of suture and by the use of pituitary extract and ergot that it is but rarely a troublesome factor. The injection of adrenalin in the uterine muscle is also of marked value in causing a flabby uterus to contract Again an in ision in the thin lower segment rather than in the thick body of the uterus greatly les ens the amount of bleeding Another factor responsible for blood loss is the relaxation of the uterus under ether narcosis as compared with local infiltration and spinal anæs Brindeau at the Tarnier clinic has demonstrated to he own satisfaction and to that of others that spinal anæsthesia causes contraction of the fundus and relaxation of the lower segment It is a proved fact that the operation under

regional or spinal anæsthesia is much less hæm orrhagic than when performed under general narcosis The ablation of the uterus for ham orrhage during the course of casarean section is so rare nowadays that it is hardly worth mention

Trauma of operation Shock following cæsarean section has been greatly decreased by the conservation of blood and by the improved technique and consequently gentle handlin of the abdominal contents It is not a very common complication nowadays and as we see it it is usually associated with hamorrhage and undue loss of time in operatin Shock is observed in a larger percentage of gravido cardiac patients

than in any other group of patients

3 Sepsis Infection has always been an important if not the most important cause of mortality and morbidity in existeen a ction and at the present time stands out as the most The time at which the serious complication operation is performed is the most important single factor in dealing with infection This is especially true in the light of the work of Harns and Brown who have demonstrated at cresarean section the bacterial invasion of the uterus early in labor even with unruptured membranes The classical operation performed before labor or at the onset of labor is relatively safe as compared with the same procedure performed in advanced labor Vaginal examinations and the rupture of the membranes also increase the danger of sepsi to a marked degree Infection has been decreased by the use of the lower segment operations which will be taken up later in the paper

B Late dangers or disabilities r In alidism As a result of a major operation a number of women may have poor health for a more or less

prolonged period of time

The incapacity to bear other 2 Sterility children in a small group of cases is e pecially apt to follow uterine infection and suppuration with resulting destruction of the endometrium

3 Rupture of the uterus The danger of rup ture of the uterus during pregnancy is a real one and has to be taken into consideration. The danger of a subsequent labor and the immediate danger of a ruptured uterus at delivery are not to be looked upon lightly The low operations have strikingly decreased the danger of ruptu e of the uterus during pregnancy and labor and have therehy added to the safety of abdominal delivery

In varying degree these 6 chief factors have been of influence in the development of the

technique of cresarean section

#### THE INCISION IN CASARCAN SECTION

In the early days of casarean section the abdomen was opened at the most prominent part obviously over the uterus. The incision was started near the symphysis and carried to a point near the riphoid cartilage to the right or to the left of the umbilicus The uterus was delivered and incised quickly in the median line in the corpus There was a vast amount of handling of uterus and intestines large gauze packs even towels were used for packing and there was as we should expect now considerable harm done to the mother. The child was usually delivered by the breech the placenta and membranes were extracted manually through the uterine incision and suture of the uterine incision was accomplished in layers one to four layers being ad vocated by different operators. The suture materials advised were silver wire bronze wire silk linen silkworm gut and catgut type of operation there was considerable handling of the abdominal contents and therefore considcrable shock Moreover the uterus frequently became adherent to the long scar in the abdominal wall and consequently caused fixation and distor tion of the organ To overcome these objections a smaller abdominal incision was made to the right of the umbilious the latter being used as a midpoint the uterus was incised in situ and the intestines were protected with gauze or towels Here again there was considerable handling of intestines but the adhesions proved less frequent This is the most common incision used today in performing the classical section and the one which is described in most textbooks on obstetrics

Hæmorrhage from this type of operation was rarely found to be very troublesome shock was frequently a factor as there was so much handling of intestines although this shock decreased with the size of the abdominal incision. It became much less when eventration of the uterus was abandoned Infection in the classical type of operation has always been a serious factor as the uterine incision is in no way isolated from the general peritoneal cavity Infection could come from the introduction of septic material from above but this in a large measure has been over come hy a proper skin preparation and the protec tion of the edges of the abdominal wound by means of sterile towels or rubber dam infection from below cannot so easily be prevented and as it has been proved that bacteria invade the puerperal uterus during labor or early in the puerperium these bacteria readily find their way to the peritoneal cavity between the stitches or through the stitch holes The incision in the uternse body has thick edges which bleed readily. The sutures used to close this noision must serve two purposes hemostasis and coapitation. There is always present the danger of tying the sutures so tightly in order to insure hemostasis that pressure necrosis and infection of the injured uterna muscle will result. Again the contraction and relivation of the uterna fundus during the purperium may cause the edges of the uterna wound to be ground against each other and disturb the sutures thus interfering with proper healing. In the classical type of operation injury to the peritoneum handling and exposure to air lower the resistance of the tissues and favor infection.

The high longitudinal incision next came into It was devised to prevent adhesions between the uterine wound and the abdominal wall In this procedure the abdominal incision is made directly above the umbilious the abdominal contents are walled off with gauze the fundus of the uterus is incised longitudinally and delivery accomplished At the completion of the uterine suture which is made in two layers with chromic catgut the uterus sinks below the umbilicus so that the uterine and abdominal incisions are never in contact and adhesions between the two are prevented Intestinal and omental adhesions to the uterine scar are not prevented by this tech nique and as a matter of fact have been common in my experience. Furthermore with the high incision a not inconsiderable amount of liquor amnu and blood trickle down to the pelvis where they may not be easily reached thus making the peritoneal toilet difficult I have seen more intestinal distention and paralytic ileus following this method than with any of the other accepted techniques of performing the classical crestrean

The high transverse fundal measion was brought out on the grounds of a better uterine scar diminished danger of infection and in an attempt to prevent adhesions between the uterine and abdominal incisions. It was thought at that time that the further the incision was placed away from the cervix the greater would be the chance of preventing sepsis. This method never attained much vogue. The disadvantages are those of the high operation with the longitudinal mission and advantages over the latter are offered.

In order to overcome some of the difficulties of the high operation Newell advocated a lower incision in performing the classical cassarean section. His incision in the abdomen is made in the middle line entirely helow the umbilicus and because of this intestinal handling and soil

ing are almost entirely eliminated and intestinal difference is thereby greatly diminished. The uterus is left in stiu and a longitudinal incision is made in the lower portion of the corpus

Munty herr of Cla gow in order to obtain a fetter scar and to attempt to diminish rupture of the uterus in subsequent pregnancies and labor has devised in operation which he terms at a vegment cae arean section and which fills an int intendiate place between the classical and cerval classified an extra section. He makes a trunsverse incision at the isthmus or where the lower egiment 1 ins the bot of the uterus. As he does not separate the bladder he loses not really get 1 in low in the inferior egiment. His published in the light in over 100 cae swere excellent.

#### CERVI ALCE AREAN SECTION

After hem urhage hal been contribled unliatume a mphatains dumashed in a properly performed casarean section, the attention of those interested in the prevention of peritoriatis. This resulted in the prevention of peritoriatis. This resulted in the evolution of the cervical custrean ection which went through three stage. Institute of the prevention are accountable to the prevention of the prevention of the prevention second the transperit neal cae arean section with suture of he prit neum to the abdominal wall, and third the retrovescend or subperitorial exist a certain cett.

I The ext ip rition al cosarean perations of Kuestner and Latzko be t represent this type and were devised in ord r t a om pl h delivery through the lover uterine egment without entering the peritoneal cavity Throu h a median or lateral longitudinal pelvic inci i n the unopened regitorical sac is lifted off the antern r portion of the outlet the llad ler and the low r uterine egment. The cervix is thus cleared a longitudinal incision is made and delivery 1 acc mpli hel. The true extraperi toneal assarcan section probably offers the best means of protecting the peritoneal cavity al thou hat has been demonstrated that a virulent streptococus may find its way through the intact peritoneum and cause septic peritonitis disadvantages of this method are test that not infrequently the bladder and the ureter on the side where the operation is performed are injured and fisture are produced econd the peritoneum is occasionally opened during its separation and the advantage of the extraperatoneal method is lost third the ite of operation has to be drained and the esults in suppuration and long draina e in many instances fourth there is more hæm orrhage sin e the inci ion in the lower sement has to be made to the side nearer the large ve sels

rather than in the middle line and the technical difficulties are greater and last the operation cannot be repeated because of adhesions

2 The transpersioneal casarean sects n This method I nown as the Veit Fromme Hirst opera tion was next devised with the idea of protecting the peritoneal cavity and at the same time over coming the disadvantages of the extraperitoneal method This operation is performed through a longitudinal pelvic incision the vesico uterine peratoneum as incised longitudinally, the bladder is separated from the cervix and two lateral flans of visceral peritoneum are dissected. These are united to the parietal peritoneum thus creating a so called extraperatoneal space through which a longitulinal cervical incision i made and delivers effected The peritoneal flaps are at first united by carefully applied interrupted cat gut sutures and after the closure of the cervical incision they are further approximated by a continuous catgut suture The peritoneal ed e are firmly united in the course of a few hours and thus the cervical inci ion is entirely extrapera toneal during the convalescence. This method also protects the abdominal cavity dunn delivery. The di advantages are that occasion ally the peritoneum i very thin and does not eparate well from the uterus and that it leaves a band of scar to sue extending from the cervix to the abdominal wound thus fixing the cervix at a higher point than normal in the pelvi

3a The intraperitoneal retro esical or subperi t ucal operation Kroenia threw new li ht on the subject of cervical casarean section when he claimed that the better results obtained by the method were not due to the fact that the uterus was approached in an extraperitoneal manner but because the incision was made in the thin non contractile lower segment rather than in the thick contractile body of the uterus and becau e the uterine incision was completely covered over by the bladder thus protecting the peritoneal cavity should infection occur during the puer perium The operation consists of openin the abdominal cavity by a low longitudinal incision separating the bladder from the uterus makin a longitudinal cervical incision and after the extrac tion of the child placenta and membranes closing the uterine inci ion and completely cover

neum to its original position on the uterus of lightly higher
3b The tans erse ce ical incision Experience has shown that the intraperitoneal retrovescal operation offered definite protection against peritonits and could be performed safely on

ing it by suturing the edge of the bladder pento

women advanced in labor and in cases in which the classical crestrean was definitely contra indicated. The published statistics show that the incidence of ruptured scars was also greatly lowered thus removing from cusirein section one of its real dangers. In the study of the e statistics it was discovered that the few weak scars encountered were due to the fact that the longitudinal cervical incision had been unduly prolonged upwards thus encroaching on the uterine body. It was found that the portion of the incision placed in the cervix healed solidly while that extended in the musculature might show thinning and weakness at this point. The transverse cervical incision was the next step in the evolution of the operation and permits placing the scar entirely in the lower segment without in any way encroaching upon the musculature. It seems reasonable to feel that this procedure should further reduce the already low percent a c of weak cars The operation is performed through a longitudinal pelvic incision the bladder is separated from the cervix down to the vagina and as far as possible laterally and a transverse cervical incision is made low down and is curved upward at the sides to give more room. At the completion of the uterine suture the bladder is re attached at its original level thus making the incision entirely retrovesical or subperitoneal A good idea of the scar in its entire extent may be had on palpating the anterior lip of the cervix after involution has taken place and is felt as a thin ridge under the bladder in some cases and not at all in others

I orro casarean section or casarean section fol loared by hysterectomy. The technique of this operation as performed novadays differs from the original masmuch as the stump cervical or vaginal depending upon the extent of the hysterectomy is dropped into the abdominal cavity and completely peritonealized. With the advent of the cervical casarean section the indications for this radical procedure have been greatly les end Five indications are prominent (1) mismanaged labor and frank infection (2) uterine apopleys (3) uterine myomata (4) un controllable hamorrhage and (5) carcinoma of

the cervix

Casarean section with temperary exteriors atten

of the uterus. This method devised by Portes of
the Baudelocque Clinic in 1923 is intended for
mismanaged cases with frank infection and has
again reduced the indications of hysterectomy in
a definite group of these cases. As the name
implies the sutured uterus is left on the abdomen
after the delivery of the child until involution has
alken place and the uterus exercises subsided

Then it is returned to the pelvic cavity. The field of applicability for this operation is necessarily very limited but it saves maternal and fetal lives and permits the conservation of the uterus an important factor in young women. The mortality following this operation has been exceedingly low.

l aginal casarcan vection. In 1895 Duehrsser described an operation under the name of anterior viginal hysterotomy and in 1896 called vaginal casarean section. The original operation only called for a median anterior incision through the cervix but later the technique was modified by adding the posterior incision. Thus the anterior incision was shortened and the danger of injury to the bladder during delivery considerably lessened.

Before an attempt is made to do a vagnitices area section certain requirements are essential (i) the tissues must not be exceeded first the cervix may be readily brought down into the vagina (3) the bladder must not be fixed to the uterus as it is after the abdominal cervical casarean section (4) the pelvis must be ample (5) the child must not be too large. In the absence of these requisites the vaginal casarean section should not be considered regardless of the indication.

The range of usefulness of this operation has become rather limited since the advent of the abdominal cervical constream section since the latter operation offers almost as much protection against infection and its technique is much simpler.

Vagnal cesarean nowadays is recommended when one of the following indications for the rapid emptying of the uterus arises up to the end of the eighth month of pregnancy (i) lesions of the heart lungs and kidneys (i) toxemia of pregnancy in the presence of impending convulsions and in gravide who did not improve under the conservative treatment (i) perincious voniting of pregnancy in a gravide who is dehivarted and who would not stand a long labor (ii) premature separation of the normally inserted placenta in its milder forms

Vagnal cesarean section in the hands of experienced operators has given uniformly good results when its limitations were recognized. The main complication has been injury to the bladder but it does not occur commonly.

#### COMME 11

From the foregoing one may feel that from the standpoint of technique of operation there is not likely to be great improvement in the future Hamorrhage during and after operation has been practically controlled Complications from trau ma of operation are rive. There is however one danger v hich has been lessened but the possibil it of which we must always consider senously and that is infection often leading to peritoritis. It is the chief cause of death following casarean section.

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Peritonitis may arise from the field of operation or the abdominal incision. Proper preparation of the patient and care at operation have actually made it a rare complication from the field of oneration. Sen is usually arises from the uterus through the introduction of septic material at the time of operation or from infection of the too tightly tied stitches in the uterus To avoid regitable two operations were devised extraperitoneal section and the transperitoneal section in which case the visceral and parietal peritoneum were united. The former never be came popular because of its technical difficulties because of the danger of injury to the bladder and the uret is because serious infection of the cellular tissues resulted in long drainage and finally be alise it has been proved that virulent bacteria could find their way through the intact peri toneum the rest tance of which had been lowered during operation and cause septic peritonitis The latter operation was simpler in technique and gave equally good results and therefore supplanted the first in the hands of many opera

It was next found that most infections were from inside the uterus rather than through the abdominal inci ion The problem was to get ahead of the infection perhaps by covering the uterine micision with perit neum. From this resulted the retrovesical or subpenioneal cervical operation at first with the longitudinal incision and then with the transverse cervical incision This if infection has already occurred does not prevent the formation of a phlegmon under the bladder in the infected space but in many instances it doe prevent the spreading of the infe tion to the general peritoneal cavity prevention of this localized infection is assisted in many cases through adequate draina e of the retro esical space. This cannot be secured by abdominal draina e since drainace up hill is never very satisfactory but must be effected by vaginal drainage A good method of draining con 1sts in the placing of a wick of iodoform gauze over the lower segment after the cervical incision has been closed and then suturing the edge of the bladder peritoneum to the uterus thus covering the lower segment and the wick. After the abdomen is closed the patient is placed in the lithotomy position a small incision is made in the anterior vaginal wall and the wick is partly pulled out so that one end remains under the bladder and the other comes out of the valua or the wick may be entirely withdrawn and a rubber tube substituted and sutured in place. Either method assures gravity draina e of the retroescal space. The increasin of the resistance of the peritoneum against infection by such means as lava, or with either nucleum acid and other substances has not thus far provid satisfactory.

The work of Harris and Brown in the bacterio logical study of 50 uten at exsarean section has shown some interesting results. In to elective sections performed at an appointed time at the end of pregnancy and before the rupture of the membranes the uterus was uniformly sterile The same applies to 6 cases in which the classical section was performed within 4 hours after the onset of labor In 5 patients in whom classical section was done 6 or more hours after the onset of labor bacteria could always be demonstrated in the lower uterine segment and there were streptococci present in 3 of the cases Similar results were obtained in 13 low cervical and 6 radical sections and the uterine contents were stenle only in 3 cases in which the operation was performed within a few hours after the onset of labor

These findin s tend to show why the classical section which in no way offers protection to the peritoneal cavity is safe only when practiced at the time of election \aminal examinations and premature rupture of the membranes are known to increa e the danger of uterine infection but their ab ence does not insure sterile utenne contents In a like manner a rise in temperature is an important sign of intrapartum infection yet a normal temperature does not prove that ascending infection has not already taken place Only when adequate studies of the bacterial flora of the vagina have sho vn whether the occurrence of auto infection is possible or not will we know wbether the presence of bacteria in the uterus is due to an upward extension of micro organisms already in the vagina or to an ascending infection from the vulva

The problem of preventing the growth of germs v high may be present in the lower part of the birth canal or even in the utierus at the time of operation has been attacked through the care of the abdominal incision which will usually prevent infection here and through the care of the tuterine mission in that the sutures are not

ued too tightly, and the meision is covered with pentoneum. The danger of infection of the general pentoneal cavity has consequently been reduced but the invasion of the uterine tissue not incised as well as incised is still a great problem and should be thoroughly investigated.

The introduction into the uterus (intrapento neal or subpentoneal perhaps in every case) of some substance which is non toxic or very slightly toxic to the patient and which will prevent the growth of bacteria temporarily or until granulations begin to form or tissues begin to heal may help decrease infection. Carrel Dalan solution after the extrapention of cream an section was advocated by Markoe and McPherson some to years ago but the method thus far has not received general consideration.

At a recent meeting of the Obstetrical Society of Boston one of the members advocated the use of strong sugar solution in the uterus in the prevention of puerperal sepsis and in the checking of uterine infection if it has begun on the grounds that these sugar solutions inhibit the growth of bacteria. The problem of infection in connection with cessarean section is far from settled and it is one of the urgent problems in obstetries

From the standpoint of technique the transverse cervical mission in the low easarean section offers miny advantages. It is the closest approximation to normal delivery as the child is born through an opening less than 2 inches from the normal opening but above the symphysis instead of below it. The necessary room for delivery of the child can be easily obtained especially if the sides of the ineision are curved upward. It is superior to the longitudinal incision since it can be placed entirely in the cervix and since it in no way eneroaches upon the uterine corpus. It is easily covered over by the bladder and thus made entirely subperitoneal

Draininge of the retrovesical area when deemed necessary can be easily accomplished by gravity drainage through the vagina. In cases of advanced labor with full dilatation of the certix and rupture of the membranes it permits the expression of the placentra and membranes through the vagina after peritonealization thus saving the peritoneal envity from a great deal of soiling

Finally the convalescence which follows this method closely approaches that of a pelvic delivery

#### ACUTE PERFORATION OF ULCER IOLLOWING BARIUM FILLING IN ROUTINE GASTRO-INTESTINAL EXAMINATION

B P I I CKMAN M D Du utu Miss o a Th D 1 hCl

TAHAT the roentgen ray used fluoroscopically is an invaluable aid in gastro intestinal diagnosis is a conceded fact. The use of this dia nostic method is attended by such a high percentage of accuracy that it would be unthinkable to hamper its use by too many contra indications. That there are contra indicati ns however is generally recognized but possibly not at all times so keeply realized until some unf reseen complication focuses attention upon it Casual searching of current literature has failed to disclose any reports bearing upon the unf rinhate consequences arising from the making of a barium \ ray examination In the di cussi n of a paper presented at a recent regional meeting of the American College of Surgeons reference was made to the cases cited later in this paper \umerous almissions of such catastro thes were forthcoming from men in attendance at the meeting and it became quite a parent that such mishans had occurred occasionally wherever gastro intestinal fluoroscopy was done routinely

We have had at the Duluth Clink within the past few years at least 5 cases of acute perfora tion of ulcer folloving larium meal with fluor s copy Two of the 5 perforati ns resulted fatally in one case operati n was performed too late and in the other i severe complicating pneu monta developed Some indication as to the relative frequen v f such mishaps may be ob tained fr m the fact that approximately 1500 gastro intestinal vanunations are made annually at this clinic. Alth ugh our cross index on ulcers drigno ed is undoubtedly somewhat incomplete it may be n ted that luring the past 5 years such a diagnosis lits been made in 522 cases of which 82 per cent wer cases of duodenal ul er We wish therefore to offer the following case reports and dis u si n

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The patient decided to return home before 1t 110g the hospital for treatment but shortly after leaving. Dulust was seized with severe all dominal pain. Ore at a clief was not obtained until 1's or 20 hours aft 1 per 1 rati at which time much fluid and bartium were four 1 frec the abdominal cavity. Closure posterior 1st true to 1 true and dramage were done. The patient deel did after 1 frequently after 1 frequently 1 f

CASE 4 No 4710 C B male age 1 (1 ye 1 1) sented himself in September 17936 with the nila bit fourning pain in the epigastrium of everal k birit in and vomiting for 3 days. He had had 17 vi u titik lite same sort of dit tress which had on d tut's hours after eating. During the pre ent attik h tat the pain was definitely more see 1 d v t

relieved by food

The patient was hospitalized for ob crystin Alti ugl the vomitus was reported as coffee ground in up a 1 on the day of admission a piration the f li in showed some retention but no gros cyiden 111 d s Accordingly barium wa given and on the o 11 amination a very large defect was noted in ti vi v u slih itself was con iderably dilated and atom The 1st nt was returned to bed hot packs were appled to the domen and an attempt wa made to move the barium from the stomach by lavage \1 1 t after the fluoro copy an acute perforation o u red () a tion was done 3 hours after the periorat nat viltime the exces barum was remored the ct) in closed and a posterior ga tro entero tomy mal (the latter in view of ol structive feature )

A po toperative lobar pneumonia le 1 1 1 1 third day and the patient died 6 day aft of rat
An autopsy showed that the acute pre t nit 1 ad ul

sided and that death was due to bulate all old at n um ma CASE 5 No 44197 D M made need 18 % a Jewn h had a known duodenal ulcer which had l demonstrated and treated medically at it. Clini. Surgapers of the constraints of

Surgery wa adsi ed and the patient enter I the ho pital the following day to be prepared for ope atton. Mout 30 hour after e amication an acute duo lenal pert, at on occurred. The operative procedure con 1 ted of imple closure and a posterior gastro ente o tomy from which

the patient made a satisfactory recovery

In reviewing this series one may observe that all of the patients were males in middle age. Four were within the age limits of 34 and 38 years Although this may be only coincident yet one may surmise that perfocation is not so lilely to occur with the first or second attrick nor 35 in in those cases in which great chromeity would tend to protect by excessive sear formation. With regard to incidence one must remember of course that most ulcers have their mittal onset in the third decade of life and that the proportion of males to females is about 5 to 1.

As to the location of the lesion four were duodenal and one was gastric which is in accord with the incidence ratio. That the injudicious use of the stomach tube could be a factor in the pro

duction of a perforation of a gastric ulcer could well be understood but it would seem very un likely that the same would obtain in the case of a duodenal ulcer. In the latter case in association with attempts to overcome spasm the actual weight of the barnum assisted by forceful manipulation of the stomach would very exidently be a definite factor in the cause of rupture of ulcers at the pylorus or the duodenum situated

as it were in the apex of a cone The knith of time elapsing between the examination and the perforation varied in these case from 3 to 36 hours. In Case 5 sufficient time had presumably elapsed between the filling and the perforation to have allowed the stomach to empty in spite of the tendency to retention It my rate the operative notes male no mention of the presence of barium in the peritoncal For this reason the barium as a factor CIVILV in the production of this perforation may be somewhat questionable and vet it may be fair to assume that the presence of this substance and the manipulation involved in the examination idded greatly to the stress to which the weaken ing ulcer wall was subjected

It might also be suggested at this point that the presence of barium in the peritoneal cavity mikes for increased difficulty in removing the extravasted contents by suction or sponging and thus in all probability adds further danger to the already precanous condition of the patient with a perforated ulcer. In review of the history of a patient, the presence of certain symptoms should put the roentgenologist on his guard.

I Lidence of bleeding is a well known and definite contra indication to the use of the stom with tube and barium filling. Yet in an unruarded moment one is apt to take an univarranted chunce so as to make a diagnosis with a minimum loss of time. With the evidence of recent bleeding as in Case 4 it was undoubtedly injudicious to attempt to make an X ray diagnosis. Also it is probable that in this case the ulker might have withstood the barium filling without per foration had not attempts been made later to remove the barium by havage.

2 Increasing severity of distress as compared with the patient's previous experience may be interpreted as an indication of penetration

3 Tendemess and rigidity in the epigastrium are uniavorable signs

4 Failure of food to relieve as promptly and completely as previously is significant

5 Occurrence of night pain in patients who in previous attricks had been free from this also seems to be of significance

6 L-cessive spasm as noted especially in Ca e 3 requiring considerable force to bring the cap into view should be regarded as a danger si nd and hould call for di cretion as to the amount of force used in manipulation. This is c pecially true when the spasm is associated with a gro's defect especially of the well recognized not criting type.

It is not without bestation that cases such as the eillustrating in part at least errors in judg ment and technique as well as entirely unfore seen complications are reported. Yet much of our knowledge must come through experience and I v way of error and it i with the thought if it the e reports may serve to emphasize the neces ity of exercising a certian amount of cau

in that they are offered to the Duluth Clinic it has become the custom to crution those patients in whom there is some to crution those patients in whom there is some following, a britum examination. Some of the patients are hosp italized and put to bed as soon as possible after the examination. Continuous hot packs are then applied to the abdomen Oller patients are urged to remain within

the city for the next 24 hours and to report in mediately if any severe abdominal pain occurs. The situation here is such that the great ma jority of patients on whom these examinations are mide are not primarily hospital patients and usually prefer to return home preparatory to entering the hospital for either medical or surgical treatment.

#### CONCLUSIONS

r Inc cases have been reported wherein acute ulcer perforations occurred following gastrointestinal examination

Attention has been called to certain symp toms and fluoroscopic findings which point toward a tendency to penetration

3 Within certain limits such signs and symptoms constitute contra indication to all or part of such examination.

4. Ulcer nations in whom the symptoms and

4 Ulcer patients in whom the symptoms and findings are the e-pointing toward a penetratin type of lesion should be put on their guard and urged to remain within distance convenient for prompt and adequate medical consultation until the danger of perforation is passed

#### SPONTANEOUS HÆMATOMA OF THE ABDOMINAL WALL

BY CFORGE HAIPIRIN M.D. CHICAGO

Fmth SgcalDptm tof \ thest U rsty Md 1 h! dth Sg 1 fD II M R bt W ! vM m tal H p tal

N the literature of the past decade there have appeared occasional reports of so called hæmatoma of the abdominal wall the result of a rupture of the rectus abdominis muscle or of the deep epigastric artery Review of the litera ture reveals that this apparently rare condition was known to physicians of antiquity Maydl in his classical contribution entitled

Subcutaneous Rupture of Muscles Tendons as well as Tear fractures gives accurate descrip tions of the condition as made by Hippocrate and Galen In his extensive review of the literature covering the period from 1800 to 1880 Maydl found 14 cases of spontaneous rupture of the rectus abdominis muscle

Since Maydl's investigation the subject has received attention principally at the hands of military surgeons of France Germany Russia and Austria Their reports deal with cases oc curring in vigorous young males principally soldiers and were the result of physical violence or effort. They were observed with greater frequency in recruits and were the result of jump ing lifting turning etc. A sudden unguarded movement was the cause in most cases A sudden sharp pain was felt in the lower half of the ab domen Sometime later at the site of pain a swelling of considerable size developed to the nght or to the left of the median line mass disappeared in the course of a few weeks of rest and conservative treatment

Wohlgemuth has collected 127 cases up to the year 1923 One hundred and seven of these have occurred in young muscular persons-sol

diers turners etc

A separate relatively small group is represented by cases occurring in women during pre nancy parturition or shortly after delivery The provoking incident such as coughing or vomiting is rather insignificant or it may be entirely absent The fact that practically all of the pr tients were multiparæ suggests that impairment of musculature was a factor Diagnosis of 1 twisted ovarian cvst was made in practically every case. In one case a large swelling developed shortly after delivery and was mistaken for the head of a second child

Of greater interest to surgeons however are the cases of spontaneous hematoma of the ab dominal wall occurring in elderly women without

any apparent cause. The contributing factor in these cases may be so insignificant as to escape notice Most commonly it is the result of a cough or a coughing spell. There is usually an abrupt onset with severe pain in the abdomen associated with signs of peritoneal irritation such as belching nausea vomiting obstipation abdominal distention and muscle rigidity

welling which is painful on palpation develops either to the right or to the left of the median line Diagnostic errors here are all due to the fact that it is believed that an acute intra abdominal condition exists. The most frequent diagno is is that of a twisted ovarian cyst. The condition has also been mistaken for an ovarian tumor acute appendicitis ileus incarcerated herma and cholelithiasis. The diagnosis of an acute intra abdominal process is particularly suggestive in cases in which the hæmatoma de velops in the lower third of the muscle below the semicircular line of Douglas The absence at this level of the aponeurotic sheath on the posterior surface of the muscle permits the extravasated blood to bulge into the peritoneal cavity. In Wohl emuth's series 79 took place below the navel and in 18 the rupture was below the semi circular line of Douglas The muscle at this point is supported by the thin transversalis fascia only It is also worthy of notice that the musele below the navel is narrower and has less or no tendinous bands. It is interesting to note that in the 7 cases of spontaneous hæmatoma collected by Hilgenreiner up to 1924 not one was correctly diagnosed before the operation stormy onset in I case was mistaken for ileus in 3 cases a diagnosis of twisted ovarian cysts was made Koerte mistook his case for one of a gall stone colic Behan diagnosed his case as one of acute appendicitis and in one case the diag nosis of an incarcerated bernia was made

The onset is not always sudden Blond has reported a case in a woman 73 years old who had a cough for about 6 weeks For 3 weeks coughing caused a pain under the left costal arch On examination there was found a swelling the size of a child's head with bluish discoloration of the skin over it At operation there was found an encapsulated structure containing coagulated blood Among the torn fibers of the rectus mus cle was encountered a bleeding vessel a branch

of the superior epigastric artery. The diagnostic difficulties are not limited to the consideration of intra abdominal conditions only. Even if the intramural existence of the lesion is recog nized the true condition may still be confused with an incarcerated hernia a tumor of the ab dominal wall such as sarcoma desmoid fibroma or with gumma of the rectus muscle tubercu losis or actinomycosis of the abdominal wall Bloody discoloration of the skin may develop over the swelling or about the navel with streaks running toward the symphysis pubis This tell tale symptom however occurs relatively rarely because the extravasated blood is confined within the sheath of the muscle. It has occurred in only of the 21 cases reported by Perman

The pathogenesis in this group is not quite clear The question as to whether the muscle ruptures first or whether the rupture of the ept gastric artery takes place primarily with a second ary loosening and tearing of muscle fibers is a debatable question One can readtly concede that in the first group rupture of the muscle takes place first. In the absence of a violent effort de_enerative changes in the muscle are responsible buch cases have been observed in certain infectious diseases such as tetanus typhus fever miliary tuberculosis etc. In the spontaneous hæmatoma of elderly women obes ity pendulous abdomen and atheroma of blood vessels undoubtedly play an important part

The diagnosi particularly with localization in the right lower quadrant is confusing Ro manzew has su gested a valuable dia nostic point namely that the limits of the swelling correspond to those of the sheath of the rectus Thus the swelling does not pass the median line nor the lateral | rder of the rectus muscle

#### CASE REPORT

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#### CONCLUSION

Spontaneous hæmatoma of the abdominal wall in elderly women presents a fairly typical clinical picture Because of the possibility of diagnostic errors it merits the attention of surgeons and gynecolo ists The sudden onset of rather severe pain followed by the development of a swelling which is very tender either to the right or to the left of the median line together with symptoms of peritoneal irritation should enable one to make a correct diagnosis before the operation Operative interference is indicated both as the proper treatment of the condition itself and as a means of establishing a correct diagnosis

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## SPINAL ANÆSTHESIA IN FHE TREATMENT OF PARALYTIC ILEUS

By W E STUDDIFORD M D New York
I'm th Si II pt lf W me C 1 mb U to

ARALATIC ileus is sometimes a very difficult postoperative complication to overcome. Although the great majority of cases can be relieved by common and widely known methods there occasionilly occurs a case which is unin fluenced by them. It is in these cases that spinal arresthesia may often be used successfully

Since September 1927 5 cases of stubborn paralytic deus have been encountered in the Sloane Hospital for Women. They were all treated by the usual methods but without rehef After a fair trial of these methods spinal aniss thesia was resorted to with more or less complete success. In 1 case the distention disappeared within 5 minutes accompanied by a copious evacuation of the bowels. In the others the effects came on much more slowly but all of the patients showed marked improvement within 4 hours.

#### TECHNIQLE

The patient was placed in the lateral position and the back was prepared with iodine and draped. A needle was passed through a skin wheal of per cent novocain between the second and third lumbar vertebre into the spinal canal About 6 or 7 cubic centimeters of spinal fluid was withdrawn and in this was dissolved 0.30 grains of novocain. The resulting solution was drawn into the syringe and injected into the spinal canal. Ten cubic centimeters of spinal fluid was then withdrawn and reinjected to aid in the diffusion of the solution. The attempt was made to obtain

an anesthesia reaching to the angle of the scapula as the splanchnics are said to receive branches from as high as the fifth and sixth dorsal segments. This was usually successful After this the patient was placed flat on her back. No ill effects were noted except in one case in which there was a marked drop of blood pressure. The distention in this case disappeared within 5 minutes. The rapidly reduced abdominal pressure may have been a factor in producing the condition of mild shock. The latter soon cleared up. Some of the patients remarked on the immediate relief of symptoms and others quickly fell asleep.

The following is a brief summary of the cases that have been treated in this way

Case r Mr > M white aged 40 ii para ii gravida as a limited to the Sloane Hospital on July 7 19 7 com plaining of pain in the lower al domen leucorrhoea and irregular menses. On examination it was found that she lad a relaxed pelvic floor old lacerations of the cervix b lateral adnexal mas e and a retroverted uterus On Au ust 5 a dilatation and curettage supravaginal hyster ectomy bilateral salpingo oophorectomy and hæmorrhoid ectomy were performed Pathological examination sho ved an acute salpin tis superimposed on a chronic salping tis The pat ent was in poor postoperati e condition with a low pressure pulse of 140 hypodermodysis was followed by consideral te improvement On August 6 the pulse con-tinued to be rapid and yomiting begin practically nothing being retained by mouth. Her temperature was rot de rees Γ and re pirations varied between 28 and 36 per minute The condition continued until August 11 the sixth day after operation accompanied by increasing di tent on Thud were supplied by hypodermoclysis Vomiting could not be controlled by gastric lavage. Enemata pituitrin

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185 pounds and resembling the pituitary type. Her feet and hands showed moderate cedema. Pelvic measure ments were normal except for a wide symphy is measuring 7 centimeters with a poor inclination. The bones were heavy The clinical course of her pregnancy va normal At one time she was hospitalized for rr days because of mild hypertension. She was admitted to the hospital apparently in labor on April 18 at 7 45 am She gave a hi tory of rupture of the membranes at 3 00 a m She was having slight irregular pains. The fetal heart could not be heard but fetal movements could be made out. She wa watched carefully during the next 24 lours but a no prog ress was made a exesarean ection was decided upon. Thi was done at about 5 30 p m on \pril 19 The po toperati e condition was good. On the morning of \pril o tle pa ti nt's abdomen began to become distended Large amounts of greens h fluid were somited. Durin the ne t 24 hours enemata flax eed poultice tupes pituit n etc were u ed to reduce distention but gave no relief O April 21 the second day postpartum the di tention was o marked that the abdomen had become ten e and druml ke The temperature was subnormal the pule va ri ni, The extremities were cold and clammy The patient w inextreme distress. At 11 00 a m 3/10 gram of neocain wa injected into the spinal canal. The anæsthe in e le ded to about the fourth dorsal vertebra. Almost immed ately after the injection the patient expelled a large amount of gas and liquid stool. The abdomen imm diately be ame of that the di tention disappeared within 15 minut 11 about 11 20 am the patient complianed of fainth and blurred 18 100 miles pull e wa hardly per epithle. The blood pressure dropped to 5, 30 T1 is cond tion of mild shock soon pass ed. At 21 55 pm the patient aga ness ed a large amount of flatus and faces. It in necessing the patient again. to note that undigested spinach was present in the ma tenal expelled. On April 22 moderate di tention as present. The was relieved by pituitrin and the ectal tube. The occurred again on April. After this the clin all cour exas une entitul. The temperature and tween roo and ror degrees falling below oo degree on the tenth day postpartum A slightly superfi ial wound inf c tion was present. The patient is at pre ent still in the hospital but can be discharged at an early date

Although the observation had been frequently made that the intestines were found in a state of contraction and that incontinence of faces occurred following spinal anasthesia it was not until 1922 that the therapeutic value of this effect was emphasized by Wagner. He was soon followed by many others in the French and German journals Grieg, has reviewed these cases. Some authors have apparently become so enthusiastic about the method that they recommend it as a treat ment for all types of intestinal obstruction to be

followed by operation if necessary Grieg quotes Duval who has collected the reports of 400 cases and tabulated the results as follows

	S		ľ	
	C	f l	t	
Strangulated hernia	257	7	10	
Dynami ileus	44	30	68	
Meel anical ileus	99	16	16	

He provides further data concerning dy namic deus with which this paper is chiefly concerned

	C	ĭ ſ Ì	- t
Spa modic	8	8	100
lo toperati e	TI	9	90
Heus without obvious cau e		2	100
Heus in peritoniti	18	10	55
Pure reflex ileu (renal c l )	r	0	
Ovarian cyst with taited pediale	4	I	25

Markowitz and Campbell have used spinal anasthesia in the laboratory on dogs after producing tleus by chemicals or traumatic means They have observed peristalsis carefully by means of barrum meals and the fluoroscope and have noted that peristaltic movements commenced soon after spinal anæsthesi i was given and per sisted in some experiments for over 20 hours They offer the conception that paralytic ileus is a reflex inhibition of bowel movements. Starling states that the stimulation of the splanchnic nerves causes complete relaxation of the intestine while stimulation of the vagus causes increased contraction following a brief period of relaxation He also suggests that the relaxed condition of the intestine in many abdominal conditions is prob ably due to a reflex stimulation of the splanchnic nerves which nullifies the motor action of the vagus The probable explanation of the effect of spinal anæsthesia in ileus is that the splanchnic inhibitory reflexes are blocked so that the vagus motor reflexes have full play

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## **EDITORIALS**

### SURGERY, GYNECOLOGY AND OBSTETRICS

FR. N. LIN II MARTIN M.D. Magg Edit Alt N.B. RAN 21 M.D. to t Edit William J. Mayo. M.D. Ch. f. f. Elit. 1815

DECFMBER 1928

THE RESPONSIBILITY OF THE SURCEON IN THE FREATMENT OF RENAL TUBERCULOSIS

CAREFUL study of patients with tu berculosis indicates that this disease is not a local but a general one. A sur geon who considers the removal of a kidney because it is infected with tubercle bacilli must know something about tuberculosis in general It is recognized that tubercle bacilli are carried to the kidnes by the blood stream and that the organisms gain access to the blood from a primary focus which is most often in the lung In other words renal or umnary tuberculo is is never primary. Pa tients who have tuberculous lesions in the lung very probably have lesions elsewhere many of them un uspected renal infections Therefore physicians in sanatoria for the treat ment of tuberculosis recognize the necessity of a complete physical examination of every pa tient This applies to patients with urinary pulmonary or other lesions

A complete history relative to exposure to tuberculosis which will reveal any possibility of infection during childhood should be obtained from every patient with a tuberculous infection whether the infection is in the lung or in the lund or in the lund or in the lund or in the lund or in the lund or in the lund state concerning any illness which the patient has suffered. Data relative to lung lesions alone are not sufficient all possible symptoms of lesions elsewhere in the body must be studied carefully as these may indicate to the surgeon whether or not infection has occurred in the intestine in a bone in the urinary tractect. Such lesions may be quiescent for many years but may become active at any time. A history of invision of certain tissues of the body frequently explains unsuspected active lesions which are part of a general tuberculous infection and which may be entirely symptom.

The small early lessons found in the Lidney are probably always bilateral and frequently heal. Reinfection may occur with return of active lessons and bacilli in the urine. Tuber ele bacilli in the urine obtained from the lad ney mean an active lesson of tuberculosis whether shown by the pyelogram or not Some of the small primary lessons may not heal and may develop into destructive lessons or phtiusis of the Lidney. Destructive lessons are most often unil-teral although they may be bilateral. Pathologists and chinicians have not been able to demonstrate a complete healing after a destructive lesson of more than microscopies size has developed.

Easily demonstrable destructive lesions of tuberculosis often remain quiescent for as long as two years the patient being symptom free during that time. Bilateral destructive renal lesions were watched for two years in one in stance with no progress of the lesions. The organisms disappeared from the unne and the patient became symptom free but continued to have pyuria

Many surgeons insist that nephrectomy should be performed for renal tuberculosis as soon as the diagnosis can be made. This should be done provided the other kidney has no active demonstrable lesion and provided there are no active lesions of tuberculosis else where in the body Nephrectomy may safely be performed if the patient has been under observation long enough so that the surgeon is sure that he is able to resist tuberculosis. We have observed many patients with multiple lesions of tuberculosis in the urinary tract and elsewhere who have controlled the spread of the infection and have demonstrated their ability to heal at least partially some of their lesions When such a case is encountered it is good surgery to remove one focus of infection such as the kidney because the surgeon is assured that with careful sanatorium treat ment following surgery the healing processes which have already been started will probably continue Patients have been observed with destructive lesions in one kidney and tubercle bralli from the other kidney together with extra urinary active foci Careful sanatorium treatment prevented the progress of the destructive lesions in the one kidney and arrested the extra urmary lesions and healed the tiny lesions in the other kidney this development of resistance is accomplished patients so treated recover promptly after ne phrectomy are quickly rid of their urinary symptoms and have no evidence of activity in their extra urinary foci following operation

When a surgeon advises the removal of one kidney which is known to contain a destructive process he must be certain that the other kidney is sound and has no active lesion of tuberculosis. He must also know the location and extent of other active urinary or extra urinary lesions of tuberculosis. Active extra

unnary lesions may not be considered a con tra indication to nephrectomy if the patient has demonstrated an ability to arrest these lesions and therefore has developed a resist ance against tuberculosis. Neither do I con sider an active pulmonary lesion of tubercu losis a contra indication to operation provided that after a long period of observation the patient has demonstrated his ability to resist tuberculous infection.

Because tuberculosis is a general rather than a local disease the surgical removal of one kidney which rids the body of one focus of infection is merely an attempt to assist nature in the control of a general infection. A sur geon who removes a kidney in the presence of other active lesions should see that his patient is permitted to have sanatorium treatment following operation so that he may develop resistance against the infection. Often a nationt comes to a surgeon seeking relief from urmary symptoms which are produced by tuberculosis of the kidneys with no other demonstrable lessons of tuberculosis patient may have an uneventful recovery following operation and is quickly rid of his symptoms because he has had active lesions of tuberculosis elsewhere in his body for many years and has built up a strong resistance against the infection

The responsibility of considering surgery for renal tuberculosis is great. The surgeon must be prepared to do more than nephrec tomy if he wishes his patient to be free from active lesions of tuberculosis. He must know whether or not his patient has active lesions elsewhere than in the kidney. Nephrectomy for renal tuberculosis must be preceded by sanatorium treatment in some instances and must be followed by sanatorium treatment in many other instances if clinical arrest of all lesions of tuberculosis is to be accomplished

GILBERT J THOMAS

#### SURGICAL STANDARDIZATION

If standardization is interpreted as thearbitary dictation of certain specific steps to which all must conform it is bad. In tiative and independence of thought would cease. An adherence to dogma would tend to bring divergent conditions within artificially narrow limits. Even as in uncient days when the teachings of Galen were the inspired and unalterable basis of practice there would be created barriers to progress and help would be defined to suffering manhal.

If on the other hand surgical standardization is interpreted as the avenue for transmit ing to the oncoming jumor surgeons the benefit of the experience and judgment of the seniors then it were well both for surgical novice and for natient

Surgery is employed to reheve local or gen eral disease to repair diamage or to prevent future disaster Therefore surgery seeks to ac complish a benefit for the patient. The aver age patient convolescence completed should have obtained a net advantage. Average patient because until operative mortality ceases there will be those who do not hive to attain the desired object. Not only is the patient entitled to a net advantage. Herein the to the maximum net advantage he is entitled to the maximum net advantage. Herein may standardization play its role. Whatever will tend to increase the degree of benefit and to minimize the occurrence of unhappy results becomes of necessity logical and desirable

The point of prime importance in determining the management of any case is the efficacy of the selecte i progrum to accomplish the destred result. This however must be tempered by a consideration of the ratio of operative mortality risk to pathological mortality risk and also the ratio of postoperative morbidity or loss of function to that occasioned by the disease anomaly or injury. Whatever other

factors are taken into consideration the stamp of approval or disapproval must be determined by those three indices and they should be determined with mathematical accuracypercentage of efficiency mortality ratio and morbidity ratio An inefficient surgical pro gram could not be tolerated An efficient pro gram that offered a higher death risk than the disease itself would violate the spirit of fairness that ought to dominate all civilized peoples. An efficient program of lower mor tality risk than the disease yet carryin a serious risk of future morbidity would not survive in a humane community Efficiency honesty humanity remain the basic entena Subordinate to the foregoing major con id erations but directly related to them are such matters as the conservation of anatomical structures, the conservation of function the determination of when to intervene surrically and when not to intervene the choice between single and multiple stage operations and the selection of cases that could and should be referred to other climics better equipped to undertake the necessary or indicated surgical program

Truly the argument will be advanced that these are all matters of surgical judgment and each particular problem mu t be individually solved by the re ponsible surgeon Granted but only in the case of mature and competent surgeons This is the day and generation of rapidly spreading small community hospitals Everywhere they are springing up as a re sponse to a demand that is real and not to be demed They are a boon to the communities that they serve They are almost a necessity to the dwindling number of general practi tioners in the outlying districts However they are not without an element of danger In so far as they lend encouragement to those unqualified in surgery to perform or attempt to perform operations on human beings they are a menace to community welfare. I ittle does the patient or his relatives know of the basic qualifications of his family doctor to perform this or that operation. The patient knows that he is near home and that he is saving money by avoiding the presumably large fee of the so called "specialist and with those reassuring thoughts the matter re t Sometimes the patient also rests-rests in peace forever after

There exist then situations where surgical judgment is not available and cannot be brought to bear upon the problem | The smill hospital has come to stay The occasional operator will remain. There have been created legitimate fields for surgical standardization For the younger generation of surgeons for the infrequent operator for those treading under compulsion on unfamiliar ground it were well that there be some authoritative utterance For the patient it were even better that there be authoritative discouragement of the attempt by the novice to perform opera tions of election that are far beyond his scope

Whence shall come the standards? Of ne cessity they must emanate from the larger centers In direct ratio to volume of work will come opportunity to acquire a degree of judg ment that may emancipate one from strict dependence on the dicta of others and permit

with fairness and equity to all concerned, a latitude of thought and action that might be fraught with disaster in the hands of a novice I rom those who have attained this high degree of judgment the standards must be sought

Who shall introduce the standards and en force them? Shall this power be vested in a po litically created and controlled board? Pref crably not Far better would it be for a purely professional organization national in its scope to undertake a task requiring to such a high derree the comprehension of the immutable liws of biology and pathology and also the my sterious workings of human psy chology

I rom members of the profession who have won the respect and confidence of their fellow practitioners there could be created a Board of Surgical Standardization with power to determine what surgical operations might be undertakenin any and every hospital equipped to do surgery and to intimate plainly what operations of election ought to be referred to specially equipped centers For if surgery is to confer an advantage and if that advan tage is to be the maximum obtainable advan tage then the safest paths must be followed Neither the patient nor his surgical advisers will suffer from clear guidance over the sur est and safest roads THUN FLAGG BUTLER

## MASTER SURGEONS OF AMERICA

#### SAMUEL LLOYD

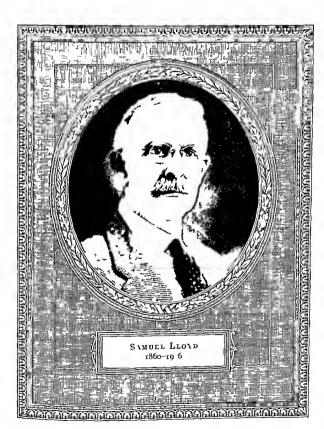
N the death of Dr Samuel Lloyd the country lost one of its foremost surgeons and a great teacher of surgery. He held an honored place in the older group of true general surgeons

Dr Lloyd was born in Jersey City New Jersey on August 4 1860 the son of Gardner Potts and Emma (Disbrow) Lloyd and died on December 19 1926 In 1888 he married Adele Perner Leck who died in June 1925

His university work began at Princeton University as a member of the class of 1882. He was prominent in various student activities a noted athlete and head of the athletic association. During his course at Princeton he first hegan experimental work on animals in relation to thoracic surgery in which work he afterward became a pioneer. From Princeton he went to the University of Vermont as associate professor of chemistry, and there studied medicine graduating from the University of Vermont and later from the College of Physicians and Surgeons. New York City.

Any attempt to trace his career from that time until he took the Post Graduate Ho pital Unit or erseas at the outbreak of the World War would lead to unnecessary detail Suffice it to say that with Dr St John Roosa he was one of the founders of the New York Post Graduate Hospital and was associated with the progress of that institution until his death. Post graduate instruction and surgery in that ho pital were profoundly influenced by him and the list of his students house staff and associates would include many of the most prominent surgeons of todiy scattered in all parts of the globe. It is related of him that one of his classes did not find sufficient thrill in doing their operative work on the cadaver of morder to make it more realistic Dr Lloyd put a solution of red ink in a large container overhead and connected this with the veins of the cadaver thus providing blood pressure. By means of a clock, the supply was turned on and off at regular intervals causing pulsation in the blood vessels. With this new apparatus the class proceeded with renewed enthusiasm.

During the early part of this period Dr Lloyd was associated with Dr L S Pilcher in the conduct of the Annals of Surgery and from time to time contributed reviews especially in spinal and thorace surgery at the same time he was making valuable contributions to all departments of surgery through his practice



## MASTER SURGEONS OF AMERICA

#### SAMUEL LLOYD

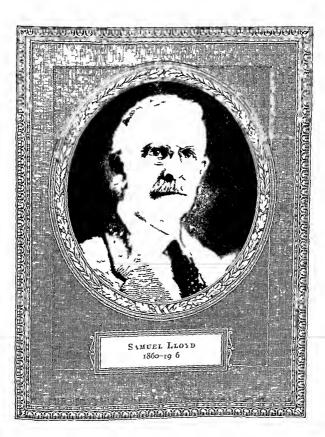
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and writings. He was the first to demonstrate that the expansion of the lung could be maintained by the patient without relying upon adhesions and me chanical apparatus. His contributions to the leading medical journals covering every phase of his work, were sought for and valued

He was associated in practice with Dr. James L. Little, and continued Dr. Little's practice after his death in 1884.

At the time of the entry of the United States into the World War Dr Hoyd enjoyed one of the largest surgical practice in New Yorl City but abandoned it without hesitation and accepted while duty July 16 1917. He had begun to organize the Post Graduate Hospital Unit in 1916 in the time of the Mexican trouble which led to General Pershing pumitive expedition. He completed the organization of this unit for overseas service later known in France as Base Hospital No. 8 and was in charge of it until Junuary 1918 later being appointed commander of the American Ked Cross flopital No., with the rank of colonel

During his service in France he received a citation from General Petshing for mentorious service in Base Ho pit al No. 3. He served with the British forces in the Cambrai offensive from October 15 to November 1 1917. After the Armstice Dr. Lloyd was ordered to the University of Puris at the Sorbonne is representative of the American Lynditionary Lord and was in charge of a large part of the educational work of the students of the Army from February 1918, to July 1919. In consideration of this work the kepublic of France appointed him Officier d Academie Franca e with silver palms and an Officier de Instruction Publique gold palms. His long years of teaching peculiarly fitted him for this kind of work and on lus return to New York he was given particular praise by Surgeon General Mernitt W. Ireland in whose words he was a tower of strength to us in France.

A little later he became actively interested in the organization of The Veterans Mountain Camp in the Adironducks and was treasurer of that association until 192 when he was unanimously elected president in which office he remained for two years refusing re election on account of the condition of his health. During his terms of office he completed the organization of the Camp and placed it on a firm financial basis.

Dr Lloyd had a wide and influential circle of friends who valued him for his charming per onality and sterling and upright character as well as for his professional achievements. He took a leen interest in all public affairs and was an active supporter of many civic and private enterprises giving liberally of his service and means. He regarded his profession as being of necessity largely philanthropic and expended much labor with no thought of reward. His many patients muss him greatly and bis friends mourn his loss.

Three children survive him Elizabeth (Mrs E H Wardwell) Augustine (Mrs J P H Perry), and Samuel Lloyd Jr CHARLES MURRAY GRATZ

## THE SURGEON'S LIBRARY

#### OLD MASTERPIFCES IN SURGERY

By ALFRED BROWN M.D. FACS Of A CA. NEBRAS A

THE SURGERY OF JOHN WOODALL

HE surg one of the British Isls vibo had and pactified during the and pactifed during the sixteenth and ent the tuics do not at first glanc ppear to have I ft an great in press n the onwar I mar h f th ir sci nce and s em to be ov rshadowe l by their ont mpo aris n oth countries par t cul rly Fran and Italy Reading the bronicl's of th urg ry of th per od reveal this to b th g n ral mpr s on but furth e am nati wh na mad the light of old politics and inh rent ra al tr ts will mitigate if not dispel the idea dlal charitably ew of thur accomple hm at

Du ing this prod England as o cupied in c t blishing hirs lf as a vorld pover and found ga nsul r empir shich was to spr ad its domini n or the ent rid Her wars we differ nt form the contental wars for in very astan a tit as necessary to tran port her tr ons a d uppl to the field of acts n As maritime trax 1 s los ach camp gn thus mea t long abs from hom nd the r stricted equipm tin sarv on 1 h ships of those days afforded no opportunit fo r search All of the sug ons h s v itings a 1 ft to us wer var sug s s rving n ships or th f ld and not m y of the cont mp a ; other nat n ttach dt the ourt nd t sving for political h no Al ll Ise the Angl Sa nm p are pract 1 fh , te f the eaa d its ug ri They quot the ance ats but not much They had no grat 1 !r to o sult so had to rely the mor comm 1 d str buted works. What points the pl 1 1 reted toy dith bett ment f surger and total fits pract to thom pet nt Duing the pod wise thou of the Ba b Surge C mpany the Ho p tals of London a dth or ug I facult s and pra tice I s th o ghout th B t h l les Look d upon from th angl th ugh th tific prog ss as not great their acc mpl hm at er a t aconsider ble

J hn Woodall a of these men He was bor in 560 1 d l arn d his surg v in the field Wh n tw ntv v a sold h v nt t France with th tro ps 1 r main d n th c t nent for se cr I ve rs study ng Am g other things he had n opportunity to ohs ry and tr at the Pest This

tood him good ste I for shortly after his return

Who likes approves and useful deems This worke i r him tis wrought

R vi ed h gh th esy f h S geo Ge al Lb

to Lon lon the g eat epidem c of 1603 broke out lile r mained in the city through the entire end mic and left he ob er ations which he called A Tr ti e of ye cure of ye I lague s hich forms part

of hi collected surg Ty of 1630

Woodall becam a member of the Barber Surgeons Company an ! n 1612 surg on to St Bartholomew s Hospital and Surgion General of the East India Company II o ganized the medical service of the Last Ind a Company and trote h first book which he published in 1617 calling it Tle Su eso s Mate In t he describes the Su gions Chest a d its cont ats an I g ves the trainment of the more usual de as a and injuries encountered both in neace and var The most my ortant of these s ur ; he recognized and tr ted with 1 mo ju ce

When I reat Br tain e tended h r operations at scal 626 Ch rles the F1 st call don the Surgeons Company to man the ships with per n el and oga i th sirvie. They in turn deputed the talk to Woodall. Two year later in 1628 he pub I h d h s Viaticum The pathy ay to the Sur g one Chest The is divoted largely to gunshot u d and i intended as he says. For the y unger ort of Surgions now imploy d in the service of His Mai stie for the tend d r l f of Rochell

In 1639 The Surgions Mate and Viaticum e r nublished and \ Treat se on the Plague and A freatise I gangr na nd sphacelos added m king a complete edition of hi v ork which is a most interesting volume. In the surgery there :

Ittl ne in fact Woodall goes hack to old method His mputati n t ch i que for exampl s the pig bil dd techn qu of von Ger dorff The n spite of the fact that he kney f Par and his work for hen di cus ing apo tumes he refers to J hn di ligo Cal and Ambrose a Pars He m ntio s suture of amoutat on wound 1 do s not speak of leat on of the vessel

O e charm of the book lies the var o s l tters poems and ded ations scrittered through it a dhs l u sons of the relative position of surgeo and internit II b lie es the su geon has as much r ght to give medicine as the physician This was rank h r sy One of the poems introduced in a disc ss on is delightful

> But he that I ght thereof esteemes May leave the booke unbought

# B Enfamm Bell Queent 23° 1823 - Eolimburgh



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# REVIEWS OF NEW BOOKS

THE publishers are to be congratulated upon collecting into one volume this series of scholarly addresses by Sir Berkele. No textbook or special article possesses the philosophical charm of these essays and their collection into one volume his made them far more widely accessible.

The volume contains many instances of the writer s skillful employment of word pictures for the purpose of bringing home his meaning more accu rately For instance he says. We may therefore regard Hunter and Lister as bridgebuilders at is out of a multitude of scientific observations of apposite inferences and of wide generalizations that such bridges are built stone by stone arch by arch Posterity will perhaps remember only the one bridge permanent indestructible all sufficing of Lister Across that bridge we have swarmed a tri umphant host and a vast new territory has met our almost incredulous eyes Hunter was forever build ing bridges ambition in design firm in their founda tions but always left unfinished Some div new architects will come and give them the full span which Hunter surely meant them to have

The volume is full of valuable practical informs ton A very concrete eximple is the chapter on preoperative and postoperative care in which detailed 
information is furnished the reader. Onc is pleased 
to note that Sir Berl elly suppress the philocathritic propensities of mirses. The indications 
for blood transfusions and the treatment of acidosis.

and alkalosıs are given

The cience of surgers in dass to come will be used with the spirit of experimental research though it will no doubt be continued to be practiced to their profit by those who are merely craftsmen Again. There are still among us brilliant operators from whom I pray to be spared when my hour has come.

The popular lectures upon cancer and upon cancer may serve as mode's to those who must address the public upon medical subjects. The author's opening, address at King's College Hospital on. The Approach to Surgery contains much valuable guidance to the younger surgeon. He saves nothing so easily de troys a man capacity for thought and his delight in indulging in it (it is also sometimes a forture) as the restriction of his mental efforts to a limited part of a subject now hardly capable of extension.

The chapter upon Mental States and Organic Disease is full of interest Sir Berkeley says the endeavors to impress upon his students that the literal translation of Neurosis is I don't how the has become less reluctant to consider surgical treatment for obvious organic disease in those suffering from grave forms of mental disorder

AD ES S A SUBJECTS BY B k 1 y M youh B t Phidlph d Lod W B S d C mp y y 8 The chapters upon Perforation of Gastric and Duodonal Ulcers Acute Lancreatitis and upon The Gall Bladder and its Infections are illumining and authentic presentations of these subjects Preparate. Christopher

TN their book on local anæsthesia in surgery of the I head and neck Fortmann and Leduc give the result of twelve years of the study and the applica tion of the technique used by them at the University of Bordeaux The book is systematically arranged in ten chapters covering the entire field of operative procedure upon the head and neck. The first chapter is devoted to a discussion of generalities and detailed description is given of all instrumentation and neces sary equipment In the following chapters indi vidual procedures are discussed. The indications the preparation of the patient and the anatomical considerations Illustrations accompany each pro cedure This makes a ready reference for a short review of any operation The authors use local anæsthesia for all procedures about the head and neck Rudical mastoids Killian operations on the frontal sinus etc are all done with one per cent novocun preceded by scopolamine morrhine is the method of choice in all cases and the authors consider it the best anæsthesia in curretting the tym panic cavity Sometimes a facial paresis results if the canal happens to be eroded However this is rare and usually recovers in a short time

Four methods of applying local annesthesia are described injection tamponization topical application and spray. The last method is sometimes produced naturally for when a solution of occarie is injected into the traches and the patient coughs the fine droplets are deposited in the interior of the

larynx

The hook is well arranged and is complete in all essential details plastic surgery of the face recon structive surgery of the nose broncho cosophagos copy and deep cervical amosthesia are all included in this work. The illustrations are plentiful and well delineated.

The book is a valuable and needed contribution to otolary ngology John F Deign

MOST authors modestly refrain from attempting to teach their equals or their betters—hence the opening sentences of most prefaces admit that the book at hand was written for the student and general practitioner. The slight interest h latter has in the eye indicates that no satisfactory medium of instruction has as yet arisen. There are some simple truths that the practitioner should know but no text or lecture has ever been presented which was not confusing because of too much detail and unner

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does not find it necessary to keep turning pages con tinually in order to find the figures ref rrid to in the

descriptive matter On the vhole the author ha kept in touch with the recent ad ances in surgery and has a clud d that which is of lasting value but the section on the thorax might hav been somewhat more extensive in vie v of the great strid s in thoracic surgery and bronchoscopy The use of the old terminology the BN in parenthe es a som what su pri ing

in a n w text but does not d tract from the funda ment I val of the book M HAR L MASO

In h s little volume Orrin enumerates the condihas been found of value and describes the application of fascial grafts for the separation of superficial scars from underlying bone the use of fascia in the repair of tendon defects as a protective investment for injured nerves as a substitute for loss of brain covering in arthroplasty and in the repair of hernia SUM ER L. LOC

F SCIA G FTIN EN P DOCT DP CT CE I TE M I OC TE DET CHING I III C OTTO DEL FRCS (Ed.) Lel b gh d Lo d O! d B yd 19 5

## BOOKS RECEIVED

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# AMERICAN COLLEGE OF SURGEONS

# GRAND CURIOSITY 1

BY SIR SOUTRE SPRIGGE M D FRCP FRCS TONDON ENGLAND Fd t f The Lane t

HERE is not only an adequate life of John Hunter in existence and an excellent skele ton life in the British Autional Dictionary of Biography but for a long eries of years official and pious orations have been delivered in his memory. Of these naturally the most important ones have been delivered in the theater of the Royal College of Surgeons of England adjacent to the Hunterian Museum that eternal monu ment which he erected to his own memory and the e in every case bave been published separately or in The Lancet It is therefore unnec essary and indeed would be impertinent to de scribe in any detail to uch an audience as this the life of Hunter liut in order to are meaning and coherence to the reflections which his tremen dous work evokes in me at the present moment it is necessary to remind you of a few salient points

and dates in his biography

John Hunter was born oo years ago on Valen tine s Eve or day of 1728-at bis father's farm near Glasgow Youngest of a family of ten he disliked chool hated books lived in the open fields as far as was possible studied animal life especially birds and insects mucked about (pardon the slang there is no other appropriate expression for it) his father's farm was appren ticed for a time to a relative a timber merchant and cabinet maker and with that odd equipment turned up in London at the age of o to assist an elder brother William who was at that time con ducting a successful anatomy school in London Of that school much has been written but just hefore the bicentenary celebrations in honor of John Hunter which took place in London last February through the mediation of that famous disciple of Hunter Sir Arthur Keith and the gen erosity of Dr Louisa Hamilton there came into the possession of The Lancet a series of letters which de cribe from a contemporary pen the life of the Hunters at the time when this school was at the zenith of its work. The letters were written by Dr Louisa Hamilton's ancestor William Ham ilton to his father Thomas Hamilton professor of anatomy in the University of Glasgow and a friend of the Hunter family The fact that the Hunters were friends of the Hamiltons in itself indicates that John Hunter's father was in as o ciation with one of the most brilliant Scotti han tellectual clan for these were the Hamiltons three of whom were professors of anatomy in the University of Glasgow and one of whom Sir William Hamilton was the philosopher of world fame Sir William Hamilton's grandfather Thom as Hamilton professor of anatomy in the Uni versity of Glasgow in 1,51 was a fellow student of John Hunter though his enior and rode with John when be proceeded on horseback to join William Hunter in London in September 1,48 Later namely in 1777 William Hamilton fol lowed in the footsteps of his father coming to London to study with both William and John Hunter and the charming and informative letters which William then wrote to his parents tell an intimate story of the ocial million in which the Hunters lived and well indicates the ab orbing way in which the anatomical studies of the chool were pursued. The indications may be slight, but the picture which they draw is clear They show an absolutely absorbing interest in the pursuit of science. They tell of social gatherings and jaunts of amusement they deplore the results of alcoholic excess while they allude with approba tion to the pleasure derived from moderate drinking but throughout they de cribe a modestay intellectual society where the pursuit of knowledge was the object of life The background of John's early career was in keeping with its famous developments

So John became a mad dissector and while he walked the medical school of St. George's hospital he was all the time laving the foundations of and even elaborating new studies of comparative anatomy collating what might be called the lessons derived from a lack of education as a box with an intensive training as a young man For one who was to become the greatest and most original comparative anatomist the world

II t ian dleed bef h America Ciller (Signo Box Oct be 5878

has ever seen no better training could have been received than that of John Hunter which sounds like an indictment of all academic edu cation. He knew the habits the mating times the sex differentiations the obstetric procedure and the farm farriery of a vast range of hving creatures and being a genius (for had be not been a genius he never could have acquired remem bered or sorted up hi knowledge) he applied this compost of hetero-eneous wisdom which was all teeming in his brain to the intensive study of human anatomy everlastingly asking himself why these things happened why these structures were so constructed why they underwent this or that change at this or that epoch and finding material for his answers by regarding the known facts of structural anatomy in the light of phenomena ob served by himself. And in addition to all this he had unusual technical alality for the manual work of dissection. The inspiration throughout was a grand curiosity -W hat? and Why?

William Hunter vas in particular a great teach er but he seems to have come the senior over John in an unfair way though it must not be forgotten that he had absolutely supported him rescued him from a life of vagabondage and set him on the road to fame and fortune. Anyhow John while William's assistant traced the de scent of the te tis in the fetus and made discov eries as to the nature of the placental enculation which Wiliam later claimed as hi own appar ently because they were done in his school

Until he was just over 30 years of age John Hunter remained an anatomical assistant in his brother's medical school but it was clearly time that the brothers parted and in 1750 symptoms of lung trouble manifest d themselves in John who was always a physically delicate man Now this was a misfortune which in the event was a blessing For it led to John Hunter applying for a staff appointment in connection with some mili tary and naval operations being conducted off the coast of France hat is known as the Seven Years War being in urse of decision Hunter was stationed at Belle Isle and later in Portugal and used his opportunities by making assiduous and first hand observations on the anatomy and physiology of sea birds tishes and all marine zoology alon its lower planes while at the same time he acquired a knowledge of military surgery as understood at that epoch studied the conditions of coagulation of the blood and probably made his first investigations as to the state among certain animals of hibernization. It was during this period presumably that he started his won derful collection

At the close of the Seven Years War he re turned to London with a certain amount of half pay and a marvelous store of unrecorded wisdom to rely upon for a professional his elihood while he had increased his responsibilities by an enga e ment to Anne Home the daughter of one of his superior officers He decided to teach anatomy while building up a surgical practice. He started to teach and to practice in Golden Square a square almost adjoining Pegent Street though so difficult to find which was at that time a residen tial district and although there seems to he no evidence that he made any particular mark at once he was able in the course of five years to find the money for the purchase of the lease of some land in the neighborhood of what is now known as the Earl's Court Road where he built a house This was in 1765 but it was not until 1771 that he appeared to find time to marry Anne Home In the meantime he took resident pupils in Golden Square held anatomy classes practised as a sur geon and continued to collect specimens. It was at this enoch that he coured the refusal of the carcasses of all the animals dying in the mena erie then attached to the Iower of London and as the menagene was placed in the fosse around the walls of the Tower it seems likely that the death rate among the beasts was a high one. In one of the Lines of Hunter we find it related that he gave five pounds for a dying tiger and had to borrow the money from a book seller an anecdote which confirms the statement of Sir Everard Home that Hunter always kept himself penniless by disburs ing all that he gained upon his collection But Home's criticism of his brother in law does not consort with the facts that in 1765 Hunter should have been able to carry out such a financial transaction as that at Farl's Court while in 1,68 he moved from Golden Square into a lar e house in Jermyn Street He must have been makin a substantial income as a surgeon or his profuse purchases would have drained his resources but the move to Jermyn Street was quite probably a wise financial action giving him more space in which to accommodate house pupils For he was able to charge what was in those days the large sum of five hundred gumeas for the privilege of apprenticeship to himself and it was in Jermyn Street that he received a pupil whose name is as widely known as his own namely Edward Jenner In this way Hunter and Jenner came to be eternal ornaments to my hospital-St George s

Hunter s life at Earl s Court is the clue to his personality-it was one long exposition of his quality of an insatiable curiosity It was the life of the curator of the most remarkable menagerie

the world has ever seen assembled in order that the inmates should give up to their owner the secrets of their lives the reasons for their being Mummals birds fishes and reptiles ranging from buffaloes to eagles from lizards to cels were there collected bred experimentally treated and cross fertilized where possible. He transplanted the spurs of his cocks into their combs he fed swine with dyes till their bones were colored and every living thing under his care was watched in its periods of health development and pathological attack that it might answer some pertinent ones tion in physiology Dogs and inchals horses and zebras were mated with a view to the study of the problems of fertilization and hybridization early studies in aquatic zoology were continued in ponds specially due to receive fish frogs leaches and especially eels the life history of which he perceived to be mysterious in viults or dens he kept his larger beasts and seems to have been fearless in his management of them

Some of the multifarious directions whither Hunter's grand curiosity led him are revealed in a profuse correspondence which took place be tween him and his famous pupil Edward Jennera pupil after his own heart. Nothing was known or even suspected during Hunter's life of what we should now describe as the phenomena of im munity nor was Jenner's first inoculation as a treatment for small pox performed until three years after Hunter's death but Hunter recognized in Jenner a kindred spirit Jenner became Hunt er's intimate friend despite the fact that he was by twenty years the younger man and it was to Jenner practising in Gloucestershire that Hunter wrote from his country menagerie-it is sig nificant of the spread of London that Hunter always alluded to Earl's Court as being in the country while it is now in the inner zone of the metropolis-outlining his doubts and asking for specimens to help him in their elucidation. In the Vicary Lecture delivered in Lincoln's Inn list Lebruary during the Hunter Bicentenary cele brations in London Dr Peachey gave some inter esting extracts from Hunter's letters to Jenner and as Baron's life of Jenner is now I understand difficult to obtain I refer you to Peachey's lecture for the following quotation Hunter keeps on asking for information as to the habits of the cuckoo and the breeding of toads and continues - If you collect eags you should also collect the nests I want a crow s nest also a magpie s in the branches where they are built. I want a nest with the cuckoo's eggs in it also one with a young cuckoo also an old cuckoo I hear you say there is no end to your wants. Again he writes

thank you for your experiment on the hedgehog try its heat and let me know the result. You do not mention a word about bats. Have you got the bones yet of a large porpoise? Is ever the salmon spwin seen after she has pritted with it? I will take any specimen of fossils you may send me or indeed any thing else. What do you think of examining cels? Their seves have not yet been found out nor their mode of propagation. In the spring of 1778 he was asking for more hedgehogs.

All that you sent me have died so that I am hedgehog less And then in one letter after referring to some amatory disappointment suffered by Jenner he adds— Let her go never mind her

I shall employ you with hedgehogs

This random series of questions covers it will be seen a huge range of physiology some of which later will have application in the actual practice of surgery It is easy to see what fundamental possibilities for physiological research lie beneath the demand for information as to the temperature of the hedgehog. For the hedgehog is an animal which is for part of its life homothermal maintain ing a uniform body temperature and for part of its life namely that spent in hibernization poiki lothermic having a variable body temperature corresponding to the environment lenner made the actual observations and how Hunter checked them with the kind of instrument that Fahrenheit had recently invented I cannot surmise and I must not pose as a student of Hunter's original writings He was as you might expect from a man of no academic training a bad and obscure writer while his observations were largely made in scattered notes. It is quite pos sible that no notes on the matter exist. It is endly probable that they were destroyed for as is well I nown Sir Everard Home burned a large quantity of his brother in law s manuscripts

Now see where all this was tending and how it came about that Hunter while inventing comparitive anatomy should also have become the father of modern surgery All the questions in respect of propagation among fish of vital proc esses among hibernaters and of the domestic habits of birds point to the intention to find some common law of life by which the normal and the abnormal as manifested in everything that byes moves and hath its being might be interpreted What we call physiology was in Hunter's day non existent for the student Hunter's lifelong and intense experience as a dissector and teacher of anatomy made him realize that every advance in his knowledge of structure ought to he associated with some fuller comprehension of function. Alter ations in structure which he observed as regu

CONCERN GINEGOLOGI INID GEOLEGIE

lated by the age sex or development of the subsect and equally so by morbid chan es in the subject ought he felt to be explained by some general laws of life. This collect it of specimens whose interest seemed directed with equal passion toward newts and luffuloes eels and leopards mants and lwarf was almost unconsciously workin on a central plan while his interreta t ries to himself and to hi friends were so heter orene it and so at parently lisc innected. He was acquiring a new kno le lgc of physicl areal prec esses a they occurred or might occur in man by drawing up in the lessons derived from his peristent ob cr ati n of similar pr ces es in animal and s metame vegetal le lif The time time when he felt that ome patt ru f life was regu latin hi of serviti n of structural thysilog ical r path lo icil hen men: This he allu led to as the vitil principle which lee need ed fas lein s methin, in his n rls uperille.1 to matter a property we ! n t under tan ! e can only ee the ne iry to t it

e can only ee the near top tot In a sense we mive be all at the protect at so have advanced in time hourther than Hunter. What we have lone is tell to Hunter have in the attempt to clue tlate this projects that we do not understand. I would not a have I did not an interest that have the and ancel diffusion to in the next that Hunter have answer own to the lact that Hunter compit in we entirely me lamistic and it is now fairly universily a limited that me ham the explanations are in unflicit that me ham the explanations are in unflicit that me ham the cyplanations are in unflicit that me ham the cyplanations are in unflicit to ham to the just being the place at which is mething in rethand a me hamster shiften and like it.

But hat Hunter hit own herful that an attempt to e mment fairly upon it in a few word must le in il quarte and e neel spend no time in discussin whith r hi jihlo jih, might have eigh min the eer still with us. The ential but come this work was priett if ind that is why he as the father f mixt in surjers, and the range over which has ten hing had a practical learing was so vast that if for the juality nly be takes he place with Har ev and LL ter.

Hire ex swork wease need the less hunters was diffue. He was fir miny vears f his life absorbed in the lucilation in ne problem—the greatest problem in all jhin? I it may be granted but form s lutin the neces are wisdom was likely to be of a cin entrated sort. It was indeed likely—anl out prod in the event—that much of the nece in endance was already in the possession of the initiated what was required being, the sifting, and marshalling of that evidence so that it should demonstrate the truth in dour, this Marve was trumphantly success.

ful in what may be described as the finest piece of detective work that science can show and the perfection of that work is perhaps be t manifested by the researcher's necessity to assume the exist ence of structures which were hidden from the naked eve until after hi death. No general curi osity would have assisted Harvey indulgence in it might only have served to divert his attention from the central problem. That his discovery by revolutionizing all conceptions of physiology, had an importance ranging further than anythin Hunter ever accomplished was due to its nature and not to Harvey's individual conceptions. Vet nothing that Hunter ever did would have had any meaning if Harvey had not supplied the ound phy pological basis for the work

Lister again was as concentrated in hi work as Hunter was diffuse The fact that Lister's im mense discovery had as far ranging an influence er the comprehension of disease as Harvey s disc) ery had over the comprehension of physi logy was due to the nature of the di covery and n t to the discoverer's conception of hi work Lister lik Harvey was a highly educated man 1 oth generally and specially for the task which he et himself and that task was in its original shape to prove that by precautions a ainst infec tion the mortality accompanying certain cases of disease or injury could be prevented. By endless pain directed to that end he achieved his purpose and haed to see the limitless boon which he had conferred muon mankind in directions which he could not have foreseen. No general curiosity as to the laws of life would have advanced his re searches

Hunter was the middle term Without Har vey s discovery all his wide ranging physiolo ical researches as far as they could have been con ducted would have been radically wrong in con ception even though occasionally correct in de duction and many of the researches would never line been attempted. For example without a right knowledge of the physics of the circulation of the blood how could Hunter have transformed his observations on the blood supply to the velvet of the antler into comprehension of the possibili ties of collateral circulation in the human subject with its result the devising of a radical cure for aneurism? And in a similar way the whole of Hunter's original surrical work was based we can assume safely upon his own physiological studies as he departed more and more from the traditional teachings of his day How great the expansion of clinical surgery was under Hunter's teaching is best gathered from reading the treatise on surgery by his devout disciple Abernethy This treatise

in the original shape was largely a reprint of Abernethy's lectures to his classes at St. Bartholo mew s Hospital which were printed in The Lancet in defiance of the lecturer s prohibition. This proceeding on the part of the founder of The Lancet was denounced by the leaders of medicine as a deed of flat piracy and huled by the rank and tile of the profession as a proper spreading of the gospel improperly withheld from them. The reporting of the lectures became the subject of furious action in law courts, and the dispute was finally decided in Wakley's favor- to become I believe a leading precedent. It is a curious reflection that it should be easier to follow Hunter's teaching through the medium of his disciple than through his own words but it was the one ill result of Hunter's defective education that he was a poor and obscure writer But the literary work that he had in view and died without accomplishment was surely an all round treatise on comparative anatomy and not a resumed application of his multifarious wisdom directed to chincal Of such a work the catalogue of his marvelous museum would have formed the back bone. Already the skeleton existed and much of the material wherewith to clothe the bones had been written—and re written in obedience to the insatiable curiosity that kept him ever questioning -when death took the author and a malignant fate consigned the work to treacherous hands

If Hunter's theories researches experiments and results would have been impossible or vitated or minimized without the sure foundation of the De Yota Cordis published precisely one hundred vears before Hunter was born so Lister's worl which took definite shape some seventy vears after Hunter's death would have been of infinitely less significance without the progress in surgical science initiated by Hunter and developed with the discovery of anæsthesia. Failing these things the application of Lister's theories must have been sadly smaller at first for many of the situations in which the combating of sensis was the key to

the rehef of symptoms and perhaps to the cure of the patient would never have presented them selves to the surgeon

Gentlemen I hope that you will agree with me in finding that the leading characteristic of John Hunter was his Grand Curiosity—and how should it have been otherwise? Where could be have derived lessons from whit accepted wisdom could he have inhibbed and from whit sources when he was inventing his science as he went along and here not where his imaginings and their progressive realizations were leading him? Hunter's wis the wisdom of the child who has the new arms of the before him knowing neither the rules nor the chances but who learns to follow the first and meet the second by perpetually asking what and why?

It is out of no disrespect to vou Sirs that I male my oration so brief. I anticipate vour gratitude for my brevity. It has cemed to me that we should be prying higher honor to Hunter if instead of familiarizing or refamiliarizing our selves with biographical details we considered one splicint quality in his character which in my humble belief was the quality which counted first in all he did.

The rise from kail yard peasant to world famed philosopher the life of piquant happenings the self infection with the disease whose pathology he expounded and whose equelæ were fatal to him the dramatic death within the walls of St George's Hospital (the scene of his clinical tri umphs) the holocaust made of his manuscripts by a trusted relative the resurrection of his bones for burial in Westminster Abbey-all these things I know that you know of and I have spared you their repetition in order that I might ask you to regard this sensational hours in medical history as a child But what a child! For he exercised his grand curiosity on the Mal er of All Things de manding of Him Irom the evidence supplied by His creations what was the plan upon which He was working Surely a Grand Curiosity

# THE EDUCATION OF THE SURGEON 1

BY WILLIAM J MAYO MD FACS POCHESTER MENTESOTA

V E mect tonight to welcome the incoming Fellows of the American College of Sur geons men who by reason of their char acter and ability have been selected by their state committees and by the officers of the College for efellowship This is an octasion of importance in their lives and in the life of the association. We who are now bearing the burdens in time must lay them down for younger men to carry. The torch of learning li hieted by those who have gone before must ever pass to those who rate to follow and who will cherish the ideals of the founders of the College of

Sir James Paget in one of his scholarly addres es of fifty years ago said that as man advances in age his body become more earthy (atheromatous) as though he were bein prepared for the grave in advance of death. The oll have the wisdom of experience. The young ha e their dreams and visions. The old and the young should travel together the oll to point ut the pitfall into which they have fallen the young devise plans whereby they may avoid them.

The position of surgers forty years ago shen I be an practice can be illustrated by the events of a meeting of the American Surgical Association held at that time in Washington D C

So called listerism had just come into len, carbolic spray was producing 1 fg in the operating rooms and that talented surgeon the late Donald Ma Lean who was in attendance still showed the effects of an acute nephritic condition which had resulted from the carbolic acid vapor. A northle delegatin nof surgeons had come from Lin land it attend this meeting and among the many excellent cintril util in single by them and 11 youtstanding a mericin surgeons a few dissus 1 hs in particular stand out prominently in my mind.

Professor Durham from England a contem porary of Lister de oted hi address to the sub ject of antisepsis

That splendid surgeon Thomas Bryant of Englan I who wrote the outstanding system of surgery of his time said that working under identical conditions with Lister he had just as good results and that all he did was to wash the wounds with a claret colored solution of tincture of todine

The great American surgeon Samuel D Gross speaking of abdominal surgery said that surgery had reached its height and that the recovery of the patient after an abdominal operation was a lucky accident at best

Moses Gunn of Chicago made an eloquent plca for the elevation of all simple as well as compound fractures of the skull because of the danger of epileosy

Fyen in the short time the American College of Surgeons has been in existence the whole aspect of medicine las changed. The microscope brought revelations which through the work of Pasteur and Lister made possible man's greatest gift to man the mass prevention of diseases due to nucro organisms The protection that has been given to man in the mas is now being applied to the individual Scientific research has gone beyond the realm of the microscope to invade the ultramicroscopic field of the colloids in which life itself resides. In the future the initiative of youth through the magic hand of research will produce in this field as startlingly si nincant changes in the foundations of medicine as the nucroscope brought in the past

Tatrick Henry in his never to be forgotten patriotic address said. Our experience in the past 1 our only guide to the future. Perhaps it would be well for one of the older generation to comment briefly on those paths of culture and education which served most wisely to bring us to the present.

The University of Michiean my Alma Mater was one of the first schools to establish courses in medicine for three years of nine months each as requisite for a degree with at least high school training or its equivalent as a required preliminary vinatomy chemistry and the basic science subjects were taught as they were related to medicine. The sick man was the hub around which the entire education turned the application of the art of medicine was based on the science of medicine.

In the h_oht of the knowledge of the times the schools of that pernod turned out excellent practitioners of medicine. There were however a great number of medical schools in which the course consisted almost entirely of two series of identical lectures given over a period of four and a half or five months for which a degree was conferred. Of course there were also many medical schools of so low a grade that only by courted could the training given be called educations.

The gradual change in medical education with its increasing cost and more stringent regulations by state boards of medical examiners for the right to practice in each state eliminated a large per centage of these inferior schools. The publication by the Rockefeller Foundation of Abraham Flex ner's splendid report on the educational facilities of American medical colleges did still more to drive the inferior schools out of the field.

During the period of low grade medical educa tion it was so easy for a person without culture and one might say with little knowledge of medicine to become a physician that the profes sion became crowded with ill trained men. As a result a general tendency developed to restrict medical education to those schools requiring of their students a good cultural background the medical schools progressed scientifically re strictions increased and today apparently there are too few physicians. Many communities which formerly had two or more physicians now have none It is true that the great advances in medicine which have made possible the elimination of infectious and contagiou diseases of all types have greatly reduced the necessity for individual medical attention and the automobiles the good roads and the air crafts have made possible the rapid transfer of patients in serious condition a considerable distance to hospitals. In the north ern states however inclement winter weather often makes this procedure hazardous if not impossible

It is probable that the reduction in the number of physicians has been one of the causes of the increase of irregular practitioners. Many small towns that formerly had trained physicians now have only one or more untrained practitioners wedded to quackenes or cults and dependent on appeal to the emotions.

Without a desire to evaluate critically our present day methods of medical education I should like to comment briefly on some tendencies in medical school training The swing of the pendulum from the poor medical school to the Class A medical school has brought a great in crease in cultural requirements two years of premedical college work are requisite in all schools many schools urge or require three or four years academic work preliminary to medicine and the education of the medical student is passing gradu ally from the clinician to the educator By edu cator I mean the man who is learned in some particular branch of the science of medicine but who has little or no chincal background Clinical professors hold less prominent positions than for merly and emphasis is placed on requirements

not always closely connected with the care of the sick. Many of the cultural requirements honor points and so forth in our medical schools appear to have been established not because they would necessarily make better physicians but be cause they cut down the number of students to those who can be taught conveniently. Often it is found that students who have been refused admittance to the medical department of the university would have been admitted to other departments on the same credits which by some circuitous reasoning are not considered adequate to admit them to the medical school

There is no reason why the so called premedical cultural subjects should not include anatomy chemistry and physiology and the so called hasic science subjects. In the old school a cultural subject was one that could not be used for gain. The modern concept of culture is that the useful can be cultural. Too often the decision as to the qualifications of the applicant to the medical school rests on eximinations in stated subjects which are memory tests and have comparatively little significance as an indication of whether or not the applicant will male a good physician.

Again there is a great delay in the age at which the physician begins practice after gradua tion from medical school A survey of the gradu ates of one of our best medical schools showed that those who graduated in medicine before the age of twenty five on the whole were of greater professional value at the end of fifteen years than those who graduated after the age of twenty five Still further showing the inadequacy of academic tests of ability at the end of fifteen years the graduates in the second half of the class in one of our most important medical schools were found to be of equal worth with those who finished in the first half Such a comparison has no particu lar value except that it brings to mind the well known fact that it is difficult to determine with out prolonged acquaintance just what are the future possibilities of a student

We should consider also that there is a loss of at least one year and often two years in gram mar school owing to the fact that the student is held to a graded course

By the Your quarter system one year's time can be saved in the medical schools The world is on a twelve months basis of work. Why young persons at the period of life when they are strongest should have three months vacation in the summer I am unable to understand

Another important consideration in medical education is that the knowledge of the educators themselves encompasses only a limited part of

medicine yet each one strives to make the student s knowledge limitless this cannot be done. The practitioners of medicine today realize that heir knowledge can cover only a small part of medicine and they are dependent on their colleagues who are trained in the other fields of medical science. The result of the crumming in medical schools has been that our medical students have been taught to memorize and acquire knowledge rather than to think and acquire wisdom.

The teaching of medicine is expensive For every dollar the medical student pays for his education either the state or endowment funds pay at least three or four dollars with the hope of giving the people better care when they are sick. Therefore are cause theoretic or academic that unnecessarily delays the student a year in his medical course is an intuit tee in all ways.

In England most of the medical schools are directly connected with a hospital and the entire training premedical as well as medical takes place in direct contact with the suk. It is gratiting to see that many of our schools are giving the entire fourth year of medicine in the hospital and are planning to add hospital training in the

third year as well

It is a waste of time for a medical student to spend three or four hours in a surgical clinic watching the removal of a brain tumor but he should be taught thoroughly to perform surgical operations in emergencies such as strangulated herma acute appendicitis and traumatism rather than the technique of the surgery of expediency in which time is not the supreme factor. In other words the speciali ed training of the surgeon must come after graduation in medicine

The recent graduate in medicine who desires to become a surgeon should at once adopt some problem of research either in pure science or chin cal invest, ation. It may be and probably will be that the research of itself will be of little value except to him but it will help to develop his scientific imagination that is the building of images to be compared with his wir facts. It will also teach him it appreciate the spirit of research which inspires many men even if he lumself does not acquire this spirit.

I hope that the time will come when every young surgeon after special training of it least three years will take a master s degree in surgery and will train himself with a view of gaining surgical recognition that will entitle him to join the Collece

The American College of Surgeons received its early inspiration from the Royal College of Sur geons of England Ireland and Edinburgh Scotland. We cannot be grateful enough to the surgeons of Great Britain who came here in the early days and gave freely of their time and wisdom in helping us to organize our College. These men have a background of knowledge and culture which goes back to the early historical period of medicine. I do not know of a finer group of men than those of the Royal College of Surgeons.

In some respects however the problems of the American medical profession are different from those of the British. In England for instance with its excellent train service splendid roads and short distances it is easy to transfer a patient to secure proper medical service and its many cities male hospitalization possible. In Canada and the United States with their 130 000 000 people and vast distances it has been necessary to organize with a view to the surgical care of the sick, and of furnishing enou h surgeons adequately trained to do this work.

Consequently the training required for entrance into the American Collere of Surgeons is that which can be met by the facilities of our best schools and the College is gradually elevating standards as the necessary educational facili-

ties are afforded

The American College of Surgeons has estab lished a ruling that an applicant for fellowship is not eligible until seven or er ht years after gradu ation from medical college This plan was adopted in order to show that the applicant i not only a man of science but also that he is adequately prepared to practice the art of surgery Durin these eight years this splendid period of what might be called the novitinte the applicant may become a member of the Junior Candidate group of the College membership in which acts as a stimulus to fulfillment of the senior requirements and gives opportunity to make headway Every man of character energy and brain power may reasonably hope to become a member of the American College of Surgeons

I would emphasuse the enormous advance that has been made in medicine and how dependent the surgeon is on his fellow practitioners for specialized knowledge. When I began the practice of medicine rarely were the two physicians of a smill town on speaking terms. Pumors carried about by over zealous friends and former patients had produced a condition of intolerance which constituted the greatest enemy of the medical profession.

The physician of all others is and has been an individual; t an almost incurable individual; t

The quarrels among physicians have been notorious and the irregular practitioners have talking advantage of this fact. In the past for a time ethics became ceremonials and during this state of affairs the people were educated by the patent medicine advertiser the quack and the cultist Individually physicians had influence collectively owing to this professional intolarnocal traction.

Today conditions are different. I very community with civic pride is established a community hospital. The cypen e of sickness in the home and the attendant he location of the household his resulted in the time particular linesses in the hospital. The phy with now bends his every effort to learn some part of organized medicine which with the aid of his colleagues will best help to mile a while

Group medicine has been misunder tood le cause it has been talked about so much from the financial standpoint. Fundamentally group mech cine has nothing to do with finance arrangements can be made whereby each patient rich middle class or poor can receive necessiry attention collectively each consultant rendering a bill for services rendered. By agreement the total charge in each case can be brought within the limit of the patient's means. Livery physician worthy of the name is practicing group medicine He is getting diagnoses of contagious and infec tious diseases through boards of health \ ray examinations through radiologists and laboratory examinations through technicians. His duty is to learn to evaluate and apply the results of such scientific machinery to the living patient

Physicians should be paid for attendance on county charity patients just as the county at torney and the county engineer are paid for doing their work, and governmental agencies should pay a proper hospital fee in charity cases. Too many times the city and the county will be found paying half or a third of what it actually costs for the hospital care of the pritent for whom they are responsible and this extra burden of expense is thrown on the common man when he enters the hospital. President Lincoln once said that the Lord must love the common people be cause he made so many of them. It is the common people the energetic industrious and rugal class, who keep the world going and pay the bills.

It has been said that advice is easy to give hard to take and usually of little value. As I look back over my experience in the practice of medicine I can see that I have learned much not only from my own experience but from watching the careers of men who began their professional lives full of enthusiasm energy and hope of these men have made great progress some have made moderate progress and others after a brief flash have made little progress

Of the three learned professions the church and the law deal with subjects more or less closed. The church is concerned with carrying out precepts and examples of ooo years 1go. The law depen is on precedents established by the yester days of life but in the profession of medicine tomorrow is the great day.

I he brain of man is a visual brain. This is not because the eye of man is mechanically superior to that of other animals but that it leads directly to consciousness and whereas in man the thinling brain the rerebrum has been built are und sight in the lower animals it has been built up from the olfactory ganglion.

Napokon said. Every man is a coward in the dark. The predominance of the sense of sight tends to induce emotional instability in the individual exposed to either physical darkness in a spiritualistic seance or mental darkness in the presence of the unknown the state of mind which prompts a boy to whistle when crossing the churchy and at night.

I have known many promising young men who in the springtime of their lives have allowed themselves to become interested in blind illevs of belief the occult things which are incapable of proof and which loosen the mind from the moorings of fact.

The surgeon must give intelligent thought to the general problems of social contacts but with a decent respect for the opinions of mankind which will give him tolerance for other people's beliefs and make him less impatient of their in firmities. In youth he should travel in an ortho dox manner with the majority, that he may save his mental efforts for his chosen profession. In age he can follow the example of Sir Conan Dovle and Sir Oliver Lodge because after all they have reached a time of life in which blind mental ever cases may afford reliet in their lessure which many receive through more healthy channels such as golf.

Systematic medical study is of the greatest value to the surgeon. I began by charging myself with one hour study a day and I did not give myself credit for advance work that is if I put in three hours. I took credit for one. I was scrupulous however in making up the deficit when it happened that I was unable to study. It is surprising how much one can accomplish by steady adherence to this type of program. The reading should be catholic. To the young surgeon

I would say do not read all surgery and tech inque for technique is constantly changing. We abandon methods of procedures which were per fectly satisfactory for something which is no more satisfactory as the ladies do their bonnets. Along with surgical literature read medical articles in high class medical journals. Do not skin but here and there select certain riticles and rend them with care especially those that have appreciated backgrough.

a physiological background I urther I would advise the young surgeon to write papers and in writing to bear in mind what the old mini ter said. Few souls are saved after the first fifteen minutes of the sermon the paper not to how how learned you are or to show the hi h type man who may be in the audience that you are in his clas I ather try to tell those in your audience who perhaps may n t kn v as much about the subject as you do somethin that may interest and help them. Do not try to make too many points The late Dr 1 J Och ner used to say If I can carry three less in in a paper it is about all that the average man whom I want to reach can absorb at one sitting anythin, over five would probably be

Ilways rememleting that man's brain is a visual brain use illustrations drawings and lan tern lides to emphasize points that you consider reilly important

In urging v u to write I do not wish to stress the i lea that your paper will be valurible to any one lut your elf but they will be of incalculal le worth to you because they will erry strilize your idea and will bring forward questions that you have not answered and must study further

In delivering paper and addre se becan by presenting them before small societies and work up to the national organizations you will find men in the small societies equally as brill and enger to learn as you will find in the large occuties.

In your spare time the curryin in of a climical investigation of a research character will add to the interest of your contributions before medical societies and e pecually will it train your mind

Finally you may become a god operator by staying at home and att n ling strictly to busi

ness but not a good surgeon. It is the mental outlook of the surgeon and not the hands that is mo t important. The late Sir Frederick Treves said that he would rather be operated on by the sound surgeon with parkinsonian disease than by the surgeon with steady hands and an unsteady mind.

You cannot get surgery from books and jour nals they help but you must see surgery All my professional life I have been a frequent visitor it the clauses of other men. When I have heard of a man who was doing something unusual and have been confidentially warned by those who hied in his community that he was a lar I have gone to see him and usually have found that he had something, worth while.

Visit surgical clinics at home and abroad but do not see too many on one visit so that you will come home with a confused viewpoint. You do not want merely to see patients operated it it is blood you are looking for go to the stock yird. Go away with a definite object and concentrate on that choose a few good surgeons study their method. If necessary stop a while to take special instruction in physiology anatomy or chemistry to make the subject clear to you

Be thorough yet efficient. We see many men who are thorough that is they acquire a producious amount of information but they are in efficient because they do not understand relative values. They have heaped up two cent pieces so to speak, which they have not distinguished from twenty dollar rold pieces.

As a last admonition do not go away to criticise you will find plenty to criticise in your own operating rooms. See only the things that are done better than you do them and be blind to the things that are not so good.

In conclusion I desire to express my grathication that I have been privileged to deliver the convocation addres during the presidential term of the founder of the American College of Surgeons the main who has given the fruitful years of his life to the development of the ideals of the College and to directing its spiritual outlook Dr. Franklin H Martin

# THE AMERICAN COLLECT OF SUM FONS—THE PAST THE PRISINI, AND THE TUTTER!

BY TRANKIN II MAI IIN M II CHE I TEINOIS

I THE OLD CUARD VERSUS THE NEW CLASS THE PERS 1885, to 1900 were a trim its nell period in American surgers, and I mught to from ludable pus to the conception of

aeptic surgery from rapid spectreul ir techni ii to deliberate and refined methods in operatin

We had been blind followers and this was the be maning of our independence. Scientific in it can had given us facts and we began to mit just the efacts. Though they did not all as a reconstitution of the man of the foreign teachers and hierarture we be, and to our own thinking. The leaders of this ran and the man and they were not just so sure of themselve that they had become provincial. They argue it is that they had become provincial. They argue it

Meanwhile there were pathfinders who were being watched and critici ed. They were going too fast even for some of the most prooffe vice Sean had written into the history of surgery bus initial chapter on the development of internal surgery. Fenger had coupled pathology with surgery. Murphy was altering traditions the Majos were building if not better than they knew better than the knew. Thus mirricles were in the making.

In substance George and to Harvey 1 et us as a group get to, either and watch one another operate 1 et us criticate 11lk out in meeting and each get the standpoint of the other Let each of us know what all of us know and let us take our knowledge at first hand from those v ho are doing things rather than from those who are talking, and writing about them

And thus the Society of Clinical Surgery was organized in July 1003 an act that give to the Surgery of the world and to the conservation of surgical patients the greatest impulse since the worl of Pasteur and Lister. It taught a group of leaders the best methods current not only in the United States but in all civilized countries.

Such advantages could not remain each we Other surgical specialists imitated One chinc and another were established they welcomed those who wished to observe the work of others and became the mecca for aspiring surgeons

II STIMULATION OF CLINICAL LITERATURE
This was the oil that was being fertilized a

f Il w fuld with po lithries of a great crop

1 r peaker become interested in this pro

or a man mental he sat me day at a popular clinar the unite time Someth of Chimerl Surgery.

We can be unite time Someth of Chimerl Surgery.

I there and is from all of our great clinical time there is not under continuous and the intraction of the continuous and the intraction of the continuous and the intraction of the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and the continuous and continuous and the continuous and th

The virial transfer was established to record the wirk of men who were actually doing surgery a printed journal for practual surgeous entitle by a his surgeous rather than by literary virters remotely cunnected with clinical work, the profits from the journal to the utilized in strengthening is influence and not put into the pool ets of but may promoters. This journal had been well comed and supported by wellingh every surgeon in the interesting audiences of that day and this experience with the journal influenced much the extension of the interest in surgical work and were there ever more constructive discussions?

Did it not mean that these men as practical practitions a were demonstrating that there existed an unorganized demand for a new form of medical society to supplement not to displace the time knoised a sociations a clinical rather than a purely academic body a shown in rather than a tell me society? The leaven had be come implanted in the mind of the silent observer and the leaven became insistent in its develop

ment
A trip had been planned which involved a sea
vorage to the Mediterranean. This individual
took ship accompanied by an inspiring and brainy
woman n_chituily ascribed as his lawful wife
The decks were broad the lessure ample and the
ship afforded opportunity for miles of deck walk
ing a hich was stimulated by the implanted
leaven.

re the mecca for aspiring surgeons

Per de taladdress del ve ed befo the Coct fith Ame Clig IS g Bosto Oct be 9 8

#### III THE CONCEPTION

The question was How could we make ac cessible to the many aspiring surgeons what was been enjoyed by the exclusive few and how enable them to see not only a few clinics but to observe the work of the individual surgeons of

these privileged groups?

The solution came suddenly like a flash of lightning The initial problem was usualized the technique approved and plans formulated. The blue of the sea reflected no flaws the soft tropical breeze brought forth no criticesms. The leaven at last had brought forth results and these results were poured with enthusiasm into the ears of the often critical companion. The blue of the Mediterranean again approved as reflected in sympathetic eves and no trace of criticism came to mar the scene. The highest court lad approved. The Clinical Congress of Surgeons was conceived.

#### IV THE CLINICAL CONCRESS OF SURGEONS OF NORTH AMERICA

This vas February of 1910 There and then it was decided that the 3 oos subscrile as to Sur CLEN GANCOLOGY AND OBSTETRICS should be invited to Chicago in November of that year as guests of the journal to observe at first hand the wrk of the lea into surgical clinicians of that mid ve term city.

On Novemi cr 7th of 1970 the first day of the two week session we writed breathlessly and anviously for the response. Many acceptances had been received—so many that it seemed too good. It was ominous. The first day 1 100 regis tered 1 500 finally. Many were in attendance.

who did not register

On No ember 19th a notice si,ned by the late Dr James B Eagleson of Seattle was bulletined at headquarters which asked any who were interested to attend a meeting for the purpo e of mal, ing permanent the organization Several hundred of the vistin, surgeons accepted the invitation and a formal association was perfected by name

The Chincal Congress of Surgeons of North America John B Yuriphy appeared on the floor thrilled the audience by a rousing speech of commendation and nominited Albert J Ochsner

as the first President

The informal meeting demonstrated beyond a doubt the demand for this new form of organization. Your orator was called to Philadelphia on December 6 1910 met a group of Philadelphia stading surgeons at the residence of John G Clark and accepted the invitation to hold the 1911 Congress in that city.

#### DIFFICULTIES

The Huladelphia Congre s was held in 1911 with a stipulated fee for those who attended sufficient to pay expenses. Eleven hundred wer, registered and the ladders of surgery in the Ouaker City furnished a magnificent pro rum of clinics. John C. Clirk was chairman of the Committee on Arrangements. Edward Martin was elected I resident and New York was selected as the host for 1912.

It had become apparent in these initial meet ings that some means should be adopted to limit the attendance to the regi tered surgeons some means of limiting accommodations at clinics to tecket holders some means of enforcing the hos pital to recognize tickets is a requirement for indusision some means of establishing an authority that would include only acceptable chinics at each session of the Congress some means of determinant who among the clinicians of the city acting as host should be invited to give chinics. Standards ethics and the general veceptability of guests and clinicians were recognized as acute problems.

During the year there had been much discus sion of our problem among those of us who were responsible for this movement. Some were sym pathetic and others decidedly discouraging, as to the wisdom of continuing this ambitious innova

#### AT LOOKING TO PERMANENCY

Your speaker received many hints from the extensive discussion which on cartial study offered a solution of the obvious difficulties and gave promise of one more long advance in proves of organized surgery on our continent. The substance of this plan was dictated to the public stenographer of the Twentieth Century on a journey from Chicago to New York preliminary to the rorg imeeting.

On arrival in New York this plan was submitted with fevershe inthu iasm to John B Murphy who was routed from his morning bath to receive the impatient emissar. Dr Murphy clothed in a bath towel reluctantly canned the improvised plan. As he read his expression grewmore and more sympathetic and as he finished he enthusiastically asked the privilege of second ing and supporting the plan when it was submitted at the mass meeting of the Clinical Congress.

The prospectus was then submitted (not with out fear and trembling) to our autocratic Presi dent Edward Martin Meanwhile the document had been put into the form of a resolution which provided for the appointment of a committee of twelve with power to act, which should proceed toward the perfection of the new organization which was to be closely allied with the Clinical Congress and would aid it in controlling the personnel of its members its clinicians and its moral and ethical regulations

Friday afternoon November 15 191 the plan was presented by your speaker to two thousand of the surgeons in attendance at the Congress Doctor John B Murphy seconded the resolution which recommended a plan for the organization

of an American College of Surgeons

President Edward Martin lost no time in urging the importance of the movement and with a few choice words of warning against imitating all ponip and circumstance of the effete past he commanded a rising vote in favor of the resolution. This vote carried with it the appoint ment of a committee of twelve on organization a majority of whom were selected almost exclusively from among the old guard of progressive sur geons who comprised the Society of Chaical Surgery as follows Edward Martin Emmet Rixford John B Murphy Rudolph Matas Albert J Ochsner Charles H Mayo Frederic J Cotton George Emerson Brewer John M 1 Finney Walter W Chipman George W Crile and Franklin H Martin

During the succeeding six months Tranklin H Martin a member of this committee visited the leading cities of the United States and Canada He conferred with groups of surgeons selected by sub committees and called together local men of prominence to take part in the discussion. These amplified groups numbering five hundred and fifty surgeons were invited to a meeting on organization to be held later in Washington

D C

At the appointed time May 5 1913 450 lead ers in the surgical profession appeared in Wash ington to assist in or protest against the estab lishment of an American College of Surgeons Under the skillful chairmanship of Edward Martin enthusiasm was stimulated enticism modified opposition discouraged a constitution and by laws adopted officers a Board of Regents and a Board of Governors elected and Novem ber 13 1013 appointed as the date for the first Convocation of the new College

Again the surgeons of all America honored the group comprising the Society of Clinical Surgery the old guard with a majority among the officers and Board of Regents The original Regents have become the veritable wheel horses of the College They were as follows John M T Finney President Walter W Chipman and

Rudolph Matas Vice Presidents Albert J Ochsner Treasurer Franklin H Martin Secre tary General George E Armstrong George E Brewer Herbert Bruce Frederic J Cotton George W Crile William D Haggard Edward Martin Charles H Mayo Robert E Mckech nie John B Murphy Harry M Sherman, and Charles F Stokes

To these from time to time other surgeons possessing vision and executive and adminis trative ability have been elected to aid in steering our course among whom I especially wish to mention Frank F Simpson William Crawford Gorgas Harvey Cushing William J Mayo Alexander Primrose William C Braisted George E de Schwemitz J Bentley Squier James B Engleson Charles H Peck Daniel F Jones Frederick W Parham Jasper Halpenny Merritte W Ireland Allen B Kanavel Arthur A Law Frederic A Besley Herbert 5 Birkett John B Deaver Henry H Sherk Lincoln Davis John G MacDougall Ernst A Sommer Charles E kahlke Robert G LeConte Horace Packard Charles E Sawyer George P Muller Frederic N G Starr I obert B Greenough John S Mc Eachern John G Clark George Henry Murphy George David Stewart Frank H Mewburn Irvin Abell A T Bazin G A B Addy C Jeff Miller Harvey G Mudd Eugene H Pool Clarence L Starr Charles F Nassau Truman W Brophy J Chalmers Da Costa John O born Polak and Herbert P H Galloway

Particularly do I desire to acknowledge the time serving work that has been conspicuous for its lovalty and disinterestedness in our Directors Associate Directors and Secretaries including John G Bowman M T MacEachern E I Salisbury Allan Craig Judge Harold M Steph ens Bowman C Crowell A D Ballou Marion T Larrow and Eleanor Gramm

#### VII EARLY ACTIVITIES

In initiating this new kind of society, there was little justification in the venture unless some thing of outstanding value should come from it The group of men who were in at the beginning were not politicians seeking personal prestige they were busy surgeons who were occupied in the practice of scientific medicine. What was the idea? Why another society?

The purpose was to organize I A comprehen sive association of practical surgical specialists and do on a large scale what the Society of Clin ical Surgery was doing on a smaller scale viz enable visiting surgeons to see surgical confreres at work in their respective environments discuss with them problems based on practical surgical experience rather than listen to hierary treatises based on theoretical deductions

2 \ \text{comprehensive association that would con cientiously enroll tho e surgeons of the American continent as in the opinion of their confirers were competent to do surgery \text{-center} the ideal of our profession an issociation which would welcome into its ranks am individual licensed physician whose credential under proper scrutiny measured up to stipulated quirements and through which the public by dinited means could recognize and of tain the services of such oualhed men

\tag{c} that all of its resources oppose hanneal dicker in (commonly known a fee sphtting or the buying and selling of patient) letween the medic I practitioner and the surge in an I so far as possible evelude from its rinks ill offen lets.

- 4 \ \text{ comprehen ive assortation that would seek by e ery legitimate means to protect the public from incompetent \( \text{h} \) honest and unnece virts surgery that would issume leads thing and eo operation with all re ource of organized scientif emdeline toward the improvement of hospital laboratories di pensaries anchi il chools—in fact every en fromment in what watgers and in medicine may be taught or price surgers and in medicine may be taught or price.
- 5 Nomprehensive association that wild operate with the people of train for them the leneits of seientific advice furnish to them the series of preventive medicine and educite them to distinguish between the richibitivo scientific medicine and the false's phistrics of quackers.

How well we have succeeded in fifteen years a matter of history

There is no doubt that our efforts have been a great factor in placing the science technique and administration of surgical practice in a supreme position of efficiency. Eight thousand et hi hundred I ellows of the College of Surgions are now pulling to₈ either to raise the practice of surgery to the highest degree I perfection Many clinical organizations are following in the wake of this great movement. There is no longer provincialism in American medicine. It is unusual for dortors to be satisfied with their own efforts. We are traveling observing and learning to practice safe surgery.

The College is the accepted leader in bettering the hospitals of the United States and Canada and its example has aided the hospitals of lates America Australia New Zealand and bear countries of the civilized world. It has been a revolutionary movement of transcend trades to the multiple of transcend trades.

to the pul he and to the profession. There is no doubt that clinical sure of and the stimulated in the different localine grant he pe pile aroused to a knowled of the deal which motivate the I college of the action of the College in Surgeons through the external meet in of the College in manufactured in a for the purp is of bringing a ministure Clinical Congress into the states and provinces and carrying to large group of laymen and comen the story

of scientific medicine

There 1 no doubt that our it there 1 in a doubt that our it there 1 in a dimission to the College which requires the film of 100 case records has impelled recoming on the value of records and has been the means of educating our profession to write better case histories to improve their literary ability and critically to observe seigntific facts.

HII THESE ARE IDEALISTIC ACTIVITIES— WHAT ABOUT THEIR ADMINISTRATION?

Meer the essions of this meeting in Boston in which each department of the College has been reported upon and discussed it is needless to review them in the brief time at my disposal

Our program and leader hip in the betterment of the pitals is now accepted by the national and international hospital associations and by ther great journals by the departments of the United States government the Army the Nay the Public Health Service the Veteran Bureau and the National Homes for Di abiled Volunteer Soldiers. The South and Central American republies Austraha and New Zealand have studied and in many place have adopted our standard.

The most convincing evidence of the veceplance of our syndrad and leadership is the fact that our eleven surves is have stimulated great improvement in hospitals. In 1918, 12 0% of the hospital with 100 beds and over met our standard in 1928, 93 16%, 50 to 99 bed hospitals, 41 3% in 1922, and 6 2% in 1928, 50 to 49 bed hospitals, 1967, in 1924, 43 87%, in 19.8 Government hospitals have advanced from 90 0% in 1925 to 60%, in 19

In many instances these surveys when first instituted were considered an interference now they are south after and welcomed. Any community deems it a tragedy to possess a hispital that is not on the approved list of the American

Colle e of Surgeons

#### IX CLINICAL RESEARCH

Clinical Research has been organized as a distinct department with an Associate Director in charge. It comprises

Committee on the Treatment of Malignant Diseases with Radium and \ Ray Robert

B Greenough Chairman

b Committee on Bone Sarcoma (historically known as the Ernest Amory Codman Reg istry) Dallas B Phemister Chairman

c Board on Traumatic Surgery Frederic 1

Besley Chairman

d Committee on the Treatment of Fractures

Charles L Scudder Chairman Standardization of Clinical Laboratories

These Committees consist of strong boards of clinical practitioners and administrators who seek to furnish through their activities an annual report of the consensus of opinion of leading clinicians on their respective problems

#### NESEARCH OF LITERATURE

Our Literary Research Department is making available to clinicians an organized and author tative means of obtaining through trained workers what they desire in medical literature—either in the form of an abstract of a bibliography or of extensive research of the literature in all languages. Service of this type accessible to all clinicians whether members of the College or not takes that important work out of the hands of morganized commercial individuals or unsatisfactorily financed organizations and offers reliable censored service at less than actual cost and the expense is gradually diminishing because of our ability through proper organization to accumulate valuable material

### XI MEDICAL MOTION PICTURE FILMS

Motion picture films can and will occupy an important place in the teaching of medicine. This fact is conclusively proved by the very great in terest which has been mainfested in the program of medical motion picture films which the American College of Surgeons is fostering in co-operation with the Motion Picture Producers and Distributors of America Inc. and the Eastman Kodak Company a movement which gives greater promise than any other program that the College has undertaken a movement that will result in the development and distribution of the highest grade of medical motion pictures.

The preliminary survey of films already produced conducted by the College reveal an aston ishing amount of effort principally by individuals with many commendable results. However, there

is opportunity for an epoch making advance in education in general and in medicine in particular and this opportunity is being utilized by our affiliated organizations

## XII FEE SPLITTING

It was a bold strole when the American College of Surgeons at its initial meeting declared against the drision of fees between practitioners of medicine and surgeons. It requires courage to discuss the abominable practice which reduced to its ultimate terms is simply a traffic of patients between these two groups the buying and selling of patients with the highest bidder the purchaser regardless of his ability. It requires courage to discuss the subject because in so doing we must acknowledge that there are unworthy men in our own profession. It is a menace however, that can be eliminated only through frank recognition by the profession and education of the public.

This vicious practice will cease only when every member of the profession has the courage and the honesty to present his individual bill for services rendered and when the public will insist upon

paying each the practitioner and the specialist for his individual service

One of the qualifications for Fellowship in the College requires each and every candidate to sign a declaration against the practice of the division of fees either directly or indirectly in any manner what soese.

Each one of the five or more individual references named by a candidate in support of his application must state in writing over his signature that to his knowledge and belief the candidate

does not practice the division of fees

Each State of the United States and each Province of Canada has a Credentials Committee elected by ballot by the Fellows of the College in the respective State or Province When an applicant's name comes before his respective Credentials Committee the acceptability of the can didate from the standpoint of division of fees must be voted upon

The Central Credentials Committee of the College makes a careful scrutiny of the candidate senvironment and methods of practice and especially of the standing of the hospital in which

be does bis surgery

Finally any charge against a candidate or a Fellow of the College is carefully followed up by the central office and evidence sought upon which proof may be based. For obvious reasons it is difficult to secure positive proof of fee splitting which would be accredited in court of law. When sucb proof is obtainable the Fellow must be given an opportunity to appear before the Board of Regents and make his defense. Seldom will a guilty man appear. The alternative is acceptance of his resignation or summary dr pping of hi

The most effective safeguard against for plut ung such standardized hospital. It is blinkulf for a Fellow on the staff of an approxel h. pital it divide fees unknown to the officials. If the in titu tion or at least without their suspix in. When we receive rumors or charges that a midwidual priction, in one of our accepted ho pital it is ting fees we inform the ruthorities. If that I just that such rumors have come to use to the hot high and will be resurveed in I that the risin expirate with the pital will be resurveed in I that the risin expirate with the pital will be resurveed in I that the risin expirate with the pital will be resurveed in I that the risin cooperation in a tonly of the h. just a vital trutes lut of every honest memb r. I the i. II. I is given that the standard st

frequently reported. However the American Cillice is Surg. in in cludes in its membership only Noo of the 164000 loctors of mediume in the limit. I better in Canada. Our jurns liction extent in list of ur in Canada. Our jurns liction extent in list of ur in Canada our jurns liction extent in list of ur in Canada our jurns liction extent in list of ur in Canada our jurns liction to the living in the part of the living of the protection of fees and if the living in limit is the first our own organization we must exist in the responsibility. He coming the misk is remarked in the first our own organization in the first our own organization when the control of th

I am in a position that how or that fe splitting is very tree in thou how he had that our judicity any ugan has caused much his moture though had vithin our ranks y ho continue its jury tice.

At one of the Cre lentials C minute meeting, in an important tate with omen pre-ntt en-sider a long list of crude lates a n mir of the Committee rather more bellier in thru informed said. Until your 1 e vour while ja mos select ing candidates you will fail. Predically every member of the College in this state excepting masself and one other individual (menti ming him bis self and one other ind

There is but one procedure when I ose insinuations are made and that is to ask. How do you know? The College insists on proof and proof is difficult to obtain unless the accuser acknowledges that he is a party to the transaction

# VIII SUCCISSFUL I FADERSHIP IS MAINTAINED BY MAKING GOOD

An undertaking eannot be successful without appenling ideal ideals cannot be realized with out a sine, program which will make them come true, and a sane program cannot be successfully executed without sound financing and wise administration.

To advance clinical surgery to pursue a sound program for the improvement of hospitals to make a davic against unworthy financial dickerings to assume active interest in the standardization of surgical methods and the chimination of unnecessary operating to aid literary clinical and industrial research—in a word to accept progressive levidership in the teaching and practice of me licine in educiting the lay public in the value f cientific medicine—it was obvious that a bus in slike plan of financing would be necessary.

Our financial arrangement at the beginning was 1 a do in the custom current in the old societies at warty five dollar instantion fee and five dollars a year dues. Mer two years we realized that this will leave our program without financial sup 1 mt. The founders of the College represented by sur Board of Kegents were not satisfied to back monther national organization in medicine fit did not possess the financial resources necessary to carry forward reforms that thad undertaken

At the June 1974 meeting in I hiladelphia the I egents started a movement that would eventure in a permanent endowment fund. A new sciety regardless of its worthy ideals could not expect to interest outside financiers in an endowment on the basis of paper aspirations. The Pegents at their morning session sold the project to them else and decided to take it before the I cllows at a meeting that afternoon and ask the support of volunteers.

The desire was to secure one thousand \$500 pledges from such members of the College as we willing and able to subscribe. As the interest on \$500 would represent the amount of the annual dues at was suggested that this amount would constitute a hie membership contribution. Every dollar pledged to the endowment would be in vested in trust securities and no part of the principal at was stipulated should at any time be extended.

One Hundred and Thirteen Thousand Dollars were subscribed at that first meeting and by December 1915 the subscriptions totaled \$526 000 I ater the kegents allocated a portion of the initiation feets to the endowment and unexpended surpluses from annual dues. The endowment fund today invested in gilt edged trust securities.

which yield slightly over five per cent has reached \$802 6∞

At the 1916 meeting in Philadelphia our By Laws were revised the initiation fee increased to \$100 oo and the annual dues to \$2500

#### VIV A PERMANENT SITE

From the beginning a friendly contest ensued in the selection of a permanent home. Washing New York Philadelphia Chicago and Cleveland were the principal contestants was easy to reach a decision but who would finance the site? Washington as the capital of the United States led as the ideal location in the East Chicago was a close second because it is the geographical and population center. The untimely death of one of our beloved founders John B Murphy led his lay and professional friends to ask the College if it would accept a permanent site in Chicago upon which a home for the College would be builded and presented to the institution as a memorial to Doctor Murphy This plan failed because of the sudden death of two of its principal lay supporters

The effort however had crystallized opinion and caused the Fellows of the College to vote in favor of Chicago as an acceptable location for the permanent home. This decision resulted from the assumption that a completed home on an accept

able site would accrue to the College without cost At a meeting of the Board of Regents in June 1919 with President William J Mayo in the chair the question of site became acute Chicago had made a promise and on that basis she had re ceived the favorable vote Chicago must satisfy the Regents that a site in that city was available or the contest for permanent home would be re opened The arbitrary Chairman would brook no delay This was June 25th If Chicago did not produce by August 15 satisfactory legal evidence that an appropriate site would be presented the Regents would look elsewhere The Chicago con tingency recognized the futility of argument with the relentless power the presiding officer and realized that immediate action was necessary

Within three days a site was selected which had upon it a stately building that would make a satis factory administrative headquarters. The President was called upon to approve. Take that was the laconic reply. In one month the business men of Chicago had subscribed three fourths of the purchase price, and members of the profession and Fellows of the College in Chicago the additional one fourth. On May 1 10 of the administrative offices of the American College of Surgeons were transferred to the permanent location.

The site also contained a suitable plot of vacant ground upon which the friends of Doctor Murphy asked the privilege to build the belated memorial and proffer it to the College as one of its administrative units. This offer was accepted. The corner stone was laid on October 23 ro23 and on June 10 1926 the Murphy Memorial building was presented to and accepted by the College. This useful structure contains assembly halls library and temporary museum space. It was built at a cost of \$500 coo and involved no outlay on the part of the College.

In the meantime the ground value of our property has advanced and with its buildings it is conservatively appraised at \$r 50 000

#### V OUR BUDGET

# Our budget for 1928 divides itself as follows

Hospital Department	\$65 000
State and Provincial Sectional Meetings	20 000
Credentials Committee Meetings	25 000
Clinical Research	5 000
Library	20 000

The funds for this budget come from the dues paid by Fellows of the College

### VI LATIN AMERICAN ACTIVITIES

As to the financing of Latin American activities Our actual surveys in Latin America followed vacation trips that were made in 1920 by Dr W J Mayo and his family and Mrs Martin and myself and in roar by Dr and Mrs Thomas I Watkins Mrs Martin and myself Several surveys were made In ro21 and 10 by Dr Francis P Corrigan of Cleveland in 1922 1924 and 19 5 by Dr Edward I Salisbury These surveys together with expenditures incident to literature and cor respondence were met by a surplus which accrued from exhibit charges at the annual meetings of the Clinical Congress funds which belong to the Col lege but which are in no way contributed toward from our investments or the dues of the Fellows For convenience of book keeping these funds have a separate ledger account in the College books as the Regents have always felt that the Clinical Congresses which are attended at any one time by not more than one third of the Fellows should be self supporting The Congress is self support ing and its surplus is available for expenses of an extraordinary nature which would not come within our stipulated budget for academic activi-

One cruise was arranged for individual members of the College their families and friends. This cruise was conducted without one cent of expense.

to the College It was financed by the individuals who participated in it

## VII OUTSIDE FINANCIAL AID

A new enterprite will not draw financial support from business or philanthropic sources regardless of the extent of its program and worth of its ideals. It must first make good. Its activities and accomplishments must attract the attention of the public. It must create an impelling sales power before gifts can be successfully solicited or voluntary contributions offered.

This has been the experience of the College This has been the experience of the College College and French College and French College Cal friends for specific purposes until recently we have not attracted bu mess or philmthropic contributions. Within the last two vears a change is noted in the attitude of the pubb. In that period we have received moneys to be used in specific work in our departments as follows. From three individual ources for special hospital nativities and research Srg oos Stooo and Stoo on The Board on Traumatic Surgery is receiving \$20 cool and \$5,00 which we have reason to believe will be duplicated. Our backing and our program are being reconized.

#### VIII BUSINESS METHODS

Much planning successful persuasion and in invertisal polite and occasionally otherwise he resulted in building our still youthful or similation on a sound basis financially

No organization can be considered on a sound for mucal foundation fit does not have the backing 1 a watchful and thrifty administration and no toundation can be o unstable as a financial one W may compliment ourselves on our satisfactory in n in process. But as an interested by 1 nder who has experienced the difficulties of accumulation I tremble to anticipate what will be ppen to our \$2000000 assets if an orgy of administrative mismanagement should ensue even for a bird period.

From the be inning of our work the Regents with disinterested persistence have supported the idea that they were administering a public trust. They have held sacred that trust.

It is not always an easy task to unstill that same attitude into the minds of half a hundred employes. Associates in our work are selected for their ability in a particular line for their initiative for their independence and for their initiative for their independence and for their initiative for their independence and for their initiative for their independence and for their initiative for their initiat

fit into and co operate with the comprehensive pro_ram which involves the labors of several other individuals who are responsible for different tasks in the same organization. In other words an espit de corps must be developed which makes each one loyal to the entire program of work in hand

Furthermore it is incumbent on each depart ment to he within its supulated budget. It is indeed gratifying to find one of these enthusistic individuals everting every effort to remain within the financial bounds that he himself has helped to arrange. It indicates commendable enterprise However year by ear he plays the game in the hope that hi important work will draw a larger portion of the budget and thus make po sible every greater accomplishments the succeeding year.

To get the 'er,' best from our individual assocrites it is necessari for each to regard the whole. In uncensored undiplomatic letter written by an indi, mant associate to a Fellow who has been accured of a mi demeanor may involve unpleas ant consequences. To be cautious and di creet are among the chief injunctions to every one

en_aged in our activities

I rom the be, inning the management has in sisted upon conducting the routine administration of the College on the strict principles of business. While ours is an educational institution each one of us is made to reabse that he i dealin, with trust funds. It may be old fashioned but if a telegram can express its meanin, in ten words eleven words are not allowed. Not is a telegram sant in place of a letter if the letter will accomplish the same can.

Time too is considered a financial asset. The loss of half an hour by a careless or indifferent aid when multiplied by forty the number in service would result in the loss of twenty hours three and one half days work. The careless one is not allowed to go uncensured in this breech of fair play And it is gratifying to testify that our great family is in entire sympathy with these r asonable requirements.

## XIX REQUIREMENTS FOR FELLOWSHIP

Important as are these administrative regulations the most difficult policy to establish was one that would enable us to select for Fellowship only the qualified surgeons and surgeal special This movied a study of measures adopted and in use by the time honored Colleges of Surgeons of England Ireland and Edinburgh. It was found that almost without exception their requirements and tests were formulated before modern surgery came into existence. They are similar to those

which are now exacted of internes and hospital aids to ascertain the candidate's knowledge of academic facts instead of his practical ability to apply such knowledge toward the accomplishment of deeds

After thorough and careful study of the whole problem there was no reason why we should begin by adapting obsolete plans to a oth century pro

gram

What requirements then should the medical practitioner meet that we may recommend him

to the public as a reliable surgeon?

First He must have graduated from a Class A medical college (or its equivalent) and he must have served at least one year as interne in a creditable hospital and two years as surgical as sistant or he shall give evidence of apprentice ship of equivalent value.

Second Five to eight years after graduation in medicine devoted to special training and to practice are normally the time requirement for eligibility to Fellowship so the candidate may prove that he has the proper temperament and is mentally and mechanically adapted to do surgery.

Third The moral and ethical fitness of the candidate as a physician and as a citizen shall be determined by reports of surgeons whose names are submitted by the candidate himself and by such other reports and data as the Credentials Committee and the administration of the College may obtain

Fourth The professional activity of the candidate shall be restricted to study diagnosis and operative work in general surgery or in special fields of surgery. His specialization in surgery or one of its specialities must be not less than 85% in communities of more than 5000 inhabitants.

and 50% in smaller communities

Fifth He shall do his work in a hospital or in stitution that will give him the benefit of scientific facilities and the aid of competent assistants

nurses and associates

Sixth He shall make formal application for Fellowship which will record full data regarding his educational opportunities his medical training and post graduate work and his literary efforts and he shall give the names of not less than five personal references

Seventh This information and the replies from his references are referred for careful scrittiny by his State or Provincial Committee on Credentials which is a committee of Fellows of the College runging in number from eighteen to thirty six Full information is sought and each member of the committee is required to vote to accept post the oppose or reject the applicant Candidates are

considered with such care that not more than one of every four is accepted at any one meeting

Eighth Not until the candidate is accepted by his State or Provincial Committee is he required to file with a committee of competent surgical specialists a sufficient number of case records of major operations which he has performed himself that the committee may definitely determine his surgical judgment his diagnostic accuracy his technical skill acceptable environment his de pendence on laboratory findings his acceptance of consultations and his immediate and remote results These records are carefully scrutinized hy a committee of practical surgeons teachers in the four Class A medical schools of Chicago This examination is thoroughly and consistently conducted Great care is exercised and the standards of the examiners are very high From 25% to 51% of the records are not accepted as sufficient evidence of qualifications for membership

This careful surveillance from the filing of the original application until the routine of investigation is successfully completed consumes from two to four years of time. The applicant's record is finally submitted to the officials of the College for consideration and as a last act to the Board of

Regents

We are proud to submit this program as one that will reveal the qualifications of a surgical practitioner and when successfully negotiated the candidate may be recognized as a real surgeon spiritually and morally worthy of Fellowship in the American College of Surgeons

Briefly these are the qualifications that have been met by this fine group of men who have been received into the Collège this evening for which occasion you have honored us with your presence. The majority of our candidates have been in practice since graduation from medical school much

longer than the required seven years

We believe that our requirements possess advantages over the purely academic Imagine asking William Mayo or Edward Martin to suhmit to an academic examination to prove their inhits to qualify as surgeons! Not only would it be difficult for them to pass such an examination even after months of cramming hut in the meantime the world would lose their services as practical oberators.

# XX JUNIOR CANDIDATE GROUP

The Junior Candidate Group forges another strong link in our propaganda against unworthy financial practices. Through it the College pur poses to accept these candidates when qualified and place them on a probationary. list (unpub lished) as early as two years after graduation. They are required to fill out and sign the same application blank, and anti fee sphtting pkedre as is required of all Fellows of the College. An unally their names if approved are reconsidered by the respective State or Provincial Committee on Credenials.

Seven years after graduation if they desire to apply for regular Fellowship they must submit another application again sign the anti fee splitting pledge be reconsidered by the respective State or Provincial Committee on Credentials and if approved submit the necessary crese histories

The Junior Candidate group furnishes a young surgeon a tie of great importance in the formative days of his career

### XXI APPRECIATION OF OUR EFFORTS

In these short but strenuous years we have been rewarded by the appreciation of organizations and of many loval and eminent men of vision and accomplishment. The Royal College of Surgeons of In-land honored us at our first Convocation by sending to us the distinguished President the n phew of Lord Lister—Sir Pick, man Godlee. In appreciation of our efforts in the Great War (for which 96% of our distinguished Fellows enrolled for service to support the efforts of our allies) the Consulting Surgeons of the

Armes of Great Britain presented to the College the Great Mace which now and for all time to come will lead our ceremonial processions

Of transcendent importance our ideals and standards have been necepted by 199 hospitals of the United States Canada Central and South Amenca Australia and New Zealand These ideals and standard are enthussistically wel comed by surgeons internists and specialists and they have commanded also the recognition of medical schools medical associations and nurses Of greatest importance they have secured the recognition and following of the great lay public

#### XXII THE HERITAGE

This is the heritage that our new Fellows receive from the old. It is the gift of the Old Guard to the New Guard this New Guard—of which, you who have but just now received your Fellowship are a part—must begin to assume the obligations that were so well maintained by the Old Guard who is tabout me and who have honored you and me by their presence on this filteenth anniversary. They are still reluctant to release their responsibilities until they are convinced that younger minds have caught the vision appreciate their opportunities and are willing to labor—and fight if necessary—for the honor of the American College of Surverons